

TECHNICAL NOTES FOR SEQUOIA®

GROUP 4C INSECTICIDE

SUMMARY

SEQUOIA is approved for use in the UK and Ireland with a dual label for both countries but there are differences between the recommendations for each country.

- A rapid acting systemic and translaminar insecticide for the control of aphids (UK and Ireland) and whitefly (UK only).
- Highly effective across a wide range of aphid and whitefly (UK only) species.
- Active by contact and ingestion.
- Active Isoclast (sulfoxaflor) the first insecticide in the chemical class the Sulfoximines, IRAC group 4C. Lack of cross resistance to all other chemical groups.
- Controls pyrethroid, carbamate, neonicotinoid and organophosphate resistant aphid types.
- Usable in Integrated Pest Management (IPM) and compatible with a range of beneficial insects and mites, see page 10.

There is a list of approved crops in Table 1, page 5.

The aphid control rate on label is 200 mL/ha. For whitefly control (UK only) the rate of application is 400 mL/ha.

Tank mix information is summarised on page 8, beneficial insect compatibility on page 10.

Use plant protection products safely. Always read the label and product information before use. Further product information, including warning phrases and symbols, is included in the main product manual.

VERSION CONTROL

Version	Publication Date	Change from previous version
04/19	April 2019	New product.
12/22	December 2022	Updated for revised product label. Whitefly (now UK only).

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These notes are designed to support the main product manual insert on SEQUOIA and advise on how to obtain the best possible pest control from the product.

INTRODUCTION

HISTORY AND DEVELOPMENT

Isoclast active (sulfoxaflor) discovered by Dow Agrosiences, now Corteva Agriscience, is the first member of a new class of insecticides the Sulfoximines. It has been developed globally for pest control in major crop groups such as cotton, citrus, soybeans, cereals, rice and grapes.

Isoclast is approved in a number of countries and was first approved in the UK as SEQUOIA in October 2018. EC inclusion date under EC 1107/2009 was in 2015.

In January 2019 Isoclast was registered in 81 countries.

SEQUOIA was released in the UK on MAPP 18677 in January 2019. In April 2019 a new joint UK / Irish label was published under MAPP 18938/PCS No 05915. There were differences between the labels in a number of areas. In 2022 further changes were made to the joint UK/Irish label which became a Corteva Agriscience product.

PESTS CONTROLLED

SEQUOIA is labelled for the control of aphids (UK and Ireland) and whitefly (UK only).

A higher rate is recommended for whitefly control (UK only).

Growers may see some effect on other sucking pests such as: psyllids, scale insects, several species of thrips, planthoppers, leafhoppers, fleahoppers, stink bugs, capsids and mealybugs, but these are not on the label and efficacy cannot be guaranteed.

SEQUOIA has a good IPM profile, see below.

ATTRIBUTES:

- Active by contact and ingestion.
- Rapid cessation of feeding, knockdown and residual control, reducing virus spread.
- Excellent translaminar activity (moves through the leaf), giving control of hidden pests in the plant canopy and on the underside of leaf.
- Excellent systemic activity. Being xylem mobile the active moves upwards in the plant.
- Unique mode of action. Effective against populations resistant to other insecticides.
- Valuable partner in rotation with other modes of action.
- Minimal impact on beneficial insects and predatory mites. Good fit in IPM programmes.
- Degrades rapidly in soil.
- Effective at low dose rates.

Figure 1:
Sequoia is fast
acting.

Peach potato-aphid.
Fallen from plant.
Elapsed time 30
minutes.



INSECTICIDE RESISTANCE GROUP

Isoclast active (sulfoxaflor) has been classified by the Insecticides Resistance Action Committee (IRAC) as Group 4C the Sulfoximines, a new class of insecticides.

At the time of writing Isoclast is the only member of the group.

- Acts on the nervous system causing tremors, paralysis and death.
- Lack of cross resistance to all other available insecticides and controls pyrethroid, carbamate, neonicotinoid and organophosphorus resistant aphid types.

PERSISTENCE IN PLANT

Although the product breaks down rapidly in the soil, it is reasonable to assume that activity will remain in the plant for 10 - 14 days after application.

APPROVED CROPS:

The label allows use in crops grown under permanent protection with full enclosure

The CRD (UK regulator) definition of permanent protection with full enclosure is:
Protected crop situations which provide full enclosure (including continuous top and side barriers down to below ground level) and which are present and maintained over a number of years.

Table 1 summarises the crops on label and the EAMU* (Extensions for Authorisation for minor use for the UK only. Different minor uses may be allowed in the Republic of Ireland.

Table 1: List of approved crops and *EAMUs (UK only).

The colours in the table differentiate the authorisation type

Crops (all permanent protection full enclosure):	EAMU* or label	Extent of authorisation	Pest
Angelica	0259/2022	GB & NI	Aphid
Aubergine	Label		Aphid and whitefly (whitefly UK only)
Blackberry	1028/2022	GB	Aphid
Burnet (salad)	0259/2022	GB & NI	Aphid
Caraway leaves	0259/2022	GB & NI	Aphid
Chilli pepper	Label		Aphid and whitefly (whitefly UK only)
Celery leaves	0259/2022	GB & NI	Aphid
Coriander leaved	0259/2022	GB & NI	Aphid
Courgette	Label		Aphid and whitefly (whitefly UK only)
Cucumber	Label		Aphid and whitefly (whitefly UK only)
Dill	0259/2022	GB & NI	Aphid
Fennel	0259/2022	GB & NI	Aphid
Fenugreek	0259/2022	GB & NI	Aphid
Gherkin	Label		Aphid and whitefly (whitefly UK only)
Lettuce	0259/2022	GB & NI	Aphid
Loganberry	1028/2022	GB	Aphid
Lovage	0259/2022	GB & NI	Aphid
Melon	Label		Aphid and whitefly (whitefly UK only)
Ornamental plant production	Label		Aphid and whitefly (whitefly UK only)
Pepinos	Label		Aphid and whitefly (whitefly UK only)
Pepper	Label		Aphid and whitefly (whitefly UK only)
Pumpkin	Label		Aphid and whitefly (whitefly UK only)
Raspberry	1028/2022	GB	Aphid
Rubus hybrid	1028/2022	GB	Aphid
Sorrel	0259/2022	GB & NI	Aphid
Spinach	0259/2022	GB & NI	Aphid
Squash	Label		Aphid and whitefly (whitefly UK only)
Sweet cicely	0259/2022	GB & NI	Aphid
Tomato	Label		Aphid and whitefly (whitefly UK only)
Watermelon	Label		Aphid and whitefly (whitefly UK only)

*These extensions of authorised use (EAMUs) provide for the use of SEQUOIA in respect of crops and situations, other than those included on the product label. No efficacy or phytotoxicity data have been assessed and as such the 'extension of use' is at all times done at the user's choosing, and the commercial risk is entirely theirs. Before use of any pesticide under an extension of authorisation, users must have a copy of the document, which is available for the UK from the HSE/CRD EAMU database. Documents are frequently revised and therefore it is

important to check that the documentation is current and correct before any use.

CROP SAFETY

No damage has been reported on any edible crops on label.

The following ornamental crops are on label:

Chrysanthemum, *Calendula* spp (Marigolds), Aster, *Bellis perennis* (Daisy), Geranium, *Nicotiana*, *Euphorbia*, *Gerbera* and *Lantana*.

Table 2 lists additional plants which have been trialled. No damage was reported.

Table 2: Ornamental plant treated in trials.

Growth stage is by BBCH* see below for definition. No damage was reported.

Ornamental	Cultivar	Growth Stage treated*
<i>Aechmea</i>	Fia	Between 41 & 65
<i>Aeschynanthus lobbiatus</i>		Between 41 & 65
<i>Azalea</i>	Hellmut Vogel	Between 41 & 65
<i>Begonia tuberhybrida</i>		Between 41 & 65
<i>Bellis perennis</i>	Bellissima Red	61
<i>Bellis perennis</i>	Tasso	65
<i>Calendula officinalis</i>	Calypso	65
Chrysanthemum	Aloha	59
Chrysanthemum	Euro	55-60
Chrysanthemum	Malibu Bianco	59
Chrysanthemum	Olawa Red	65
<i>Codiaeum</i>	Aububifolia	Between 41 & 65
<i>Codiaeum</i>	Emma	Between 41 & 65
<i>Codiaeum</i>	Gold Moon	Between 41 & 65
<i>Codiaeum</i>	Pictum	Between 41 & 65
<i>Codiaeum</i>	Sunny Star	Between 41 & 65
<i>Cordyline</i>	Redstar	Between 41 & 65
<i>Dischidia ruscifolia</i>		Between 41 & 65
<i>Dracaena</i>		Between 41 & 65
<i>Euphorbia pulcherrima</i>	Primero Red	19
<i>Ficus benjamina</i>	Golden King	Between 41 & 65
<i>Ficus pumila</i>		Between 41 & 65
<i>Gerbera</i>	Spider	65-67
<i>Hedera</i>	Montgomery	Between 41 & 65
<i>Lantana camara</i>	Radiation	62
<i>Muehlenbeckia</i>		Between 41 & 65
<i>Nicotiana rustica</i>	Havana	61
<i>Pelargonium (Geranium)</i>	Decora Imperial	65

<i>Peperomia rotundifolia</i>		Between 41 & 65
<i>Philodendron scandens</i>		Between 41 & 65
<i>Polyscias balforiana</i>		Between 41 & 65
<i>Spathiphyllum</i>	Alfa	Between 41 & 65
<i>Syngonium</i>	White Butterfly	Between 41 & 65
<i>Tillandsia cyanea</i>		Between 41 & 65
<i>Viola tricolor</i>		Between 41 & 65
<i>Vriesea</i>	Vogue	Between 41 & 65

Table 3: BBCH* Growth Stage Guide:

BBCH growth scale is a system of uniformly coding similar stages of growth of plants.

Green - mentioned on label

BBCH Growth stage	Brief description – although this will depend on the plant species involved.
12	2 true leaves, leaf pairs unfolded.
19	9 or more true leaves. Leaf pairs unfolded.
20	1 st primary shoot visible.
21	1 st side shoot visible.
40	Harvestable vegetative plant parts or vegetatively propagated organs begin to develop.
59	First flower petals visible (in petalled forms).
61	Beginning of flowering: 10% of flowers open.
62	20% of flowers open.
65	Full flowering. 50% of flowers open. First petals may have fallen.
67	Flowering finishing. Majority of petals fallen or dry.
87	Fruit ripening.

Growers are advised to test the product on a small number of plants before treating the whole crop.

APPLICATION MIXING AND SPRAYING

APPLICATION RATE

For aphid control a rate of 200 mL/ha is specified. For whitefly an application rate of 400 mL/ha is specified (UK only). For resistance management reasons, do not apply less than the recommended rate.

MAXIMUM NUMBER OF APPLICATIONS & INTERVAL BETWEEN SPRAYS

Where two sprays are allowed (200 mL per ha) they should be applied at least 14 days (UK) or 21 days (Ireland) apart. When applied at 400 mL per ha (UK only), only one spray is allowed. Different restrictions may apply with Extensions of Authorisations for Minor Use (EAMUs).

USE WITH ADJUVANTS

Trials have shown no benefits from their use.

HARVEST INTERVAL

The label specifies a 1 day harvest interval for edible plants (UK and Ireland) and 1 day for ornamental plant production (Ireland only). Treated ornamental plants or contaminated surfaces in ornamental plant production may not be handled for 8 days after application (UK only). Different restrictions may apply with minor uses or EAMUs.

WATER VOLUMES FOR APPLICATION

The water volume used should reflect the need for uniform cover and penetration of the leaf canopy. The water volume on the label is from 400 to 1200 litres per ha.

COMPATIBILITIES

TANK MIXING

There are no recommendations for tank mixing. Table 4 below lists available information on physical compatibility. Any tank mixes are at grower's risk.

Table 4: Tank mixing (see notes and restrictions at the end of this table)			
Product	Key	Product	Key
Fungicides			
Amistar	P	Signum	P
Cercobin WG	P	SL 567A	P
Microthiol Special	P	Switch	P
Proplant	P		
Insecticides			
Conserve	P	Plenum WG / Tafari / Chess WG	P
Coragen	P	Runner	P
Decis Protech	P	Steward	P
Dynamec	P	Sumi-Alpha	P
Envidor	P	Teppeki / Mainman	NC
Hallmark Zeon	P	Tracer	P
Combination mixes			
Steward + Signum	P		
Adjuvants			
Actirob B	P	Kinetic	P
Cropspray	NC	Silwet L-77	P

Fertilisers and Trace Elements			
Bittersaltz	P	Mantrac DF 3kg/ha	P
Bortrac 150 3l/ha	P	Mantrac Pro 1l/ha	P
Brassitrel Pro 3l/ha	P	Micothial Special	P
Bud Builder FL 10l/ha	P	Molytrac 0.25l/ha	P
Coptrel 0.5l/ha	P	Photrel Pro 3kg/ha	P
Croplift 5kg/ha	P	Safe N300 10l/ha	P
Epsotop	P	Seniphos 10l/ha	P
Ferleaf 1l/ha	P	Stopit 10l/ha	P
Foliar Potash 10l/ha	P	Thiotrac 300 10l/ha	P
Gramitrel 4l/ha	P	Wettable Sulphur	P
Magflo 300 4l/ha	P	Yaravita Magflo 300	P
Magnor	P	Yaravita Photrel Pro	P
Magphos K 10l/ha	P	Zintrac 700 1l/ha	P
Mancozin 2l/ha	P	Zynergy	P
Mancuflo 2l/ha	P		
Herbicides			
Kerb Flo 500	P	Laser	P
Key: P = Physically compatible. NC = not compatible. This information is prepared as guidance of physical compatibility only. No tests have been carried out on crop safety for tank mixtures. Some of the products listed may not be approved for the crops included on the approval. Some products listed may not be available in the UK or Ireland. Physical compatibility data is based on the results of an industry recognised standard test. Be aware that in the field, water hardness, pH, temperature etc. can vary. Physical compatibility does not include biological compatibility which has not been tested. Do not use any tank-mix if the mixture cannot be applied within the recommendations for individual products or if specific tank mix restrictions apply. This additional information is for guidance purposes only and use is at grower's risk. No liability can be accepted for any compatibilities beyond the label. For any new mixture do tests on a small sample of crop before wider use.			

COMPATIBILITY WITH BENEFICIAL INSECTS AND MITES

Work on compatibility with beneficial insects and mites is still underway but the following table gives a guide to current knowledge at the time of writing.

Table 5: Compatibility with beneficial insect and mites	
Beneficial	Comments
<i>Aphidoletes aphidimyza</i>	Larvae: minimum impact. Adults: no information.
<i>Amblyseius (Neoseiulus) cucumeris</i>	Harmless.
<i>Amblyseius swirskii</i>	Harmless.
<i>Aphidius colemani</i>	Larvae: minimum impact. Adults: harmful.
<i>Chrysoperla carnea</i>	Harmless.
<i>Encarsia formosa</i>	Larvae / black scales: harmless. Adults: harmful.
<i>Macrolophus pygmaeus</i>	Low sensitivity but care suggested.
<i>Orius laevigatus</i>	Some sensitivity so care suggested.
<i>Phytoseiulus persimilis</i>	Harmless.
<i>Typhlodromus pyri</i>	Harmless.

Bees:

The label now says: "Remove bumble bee colonies at the time of application and re-introduce a minimum of 6 days after application".

HOW IS SEQUOIA PACKAGED?

250 ml bottles in outers of 24.

AUTHORISATION HOLDER

Corteva Agriscience UK Limited
CPC2 Capital Park,
Fulbourn,
Cambridge UK
CB21 5XE UK telephone number +44(0) 1462 457272

Emergency Telephone Number for SEQUOIA: +44 (0)161 884 1235 (UK)
+353 (0) 76 680 5288 (Ireland)

Marketed in the UK by Fargro Ltd. Pack Size: 250 ml (outer 24).
Safety data sheet available on request.

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