

Tables with proposal for efficacy and crop safety extrapolations.

The following tables are derived from the document prepared by the Pesticide Safety Directorate under the European Commission (DG SANCO) contract. They present lists of specific extrapolations for efficacy and crop safety. The proposals in the lists are intended as a framework for evaluators, to be used alongside expert judgement and regulatory experience. They were validated by the EU Member States forming the EU Technical Group on Minor Uses - North. In the current absence of information for the southern region, they were complemented, by input from the EU Technical Group on Minor Uses - South, prior to adding them to EPPO website. Two columns were added, each providing validity for north and south respectively. These tables will be eventually replaced with EPPO tables which are under development for the EPPO region.

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Table 1 is extrapolation matrix for fungicides and it is not presented here.

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The original PSD document may be found on:

Commission website

http://europa.eu.int/comm/food/plant/protection/resources/minorcrops_en.pdf

http://europa.eu.int/comm/food/plant/protection/resources/minorcrops_safety_en.pdf

or PSD website

<http://www.pesticides.gov.uk/approvals.asp?id=733&link=%2Fuploadedfiles%2FWeb%5FAssets%2FPSD%2FSANCO%5FD3%5FS12%2D395857%2Epdf>

FUNGICIDES

Table 2 Proposed permitted efficacy extrapolations for cereal diseases

Test organisms		Can extrapolate to		N	S
Test crop	Target disease	Crop	Disease		
Winter Wheat or Winter Barley	All diseases	Minor cereals	Diseases of the same genus, except the following diseases of oats, powdery mildew [†] , crown rust [†] and <i>Fusarium</i> seedling blight [†] .	x	x
Winter Barley	All diseases	Spring Barley	All diseases, except powdery mildew [†] , loose smut [†] and leaf stripe.	x	x
Winter wheat	<i>Fusarium</i> seedling blight	Barley	<i>Fusarium</i> seedling blight	x	x

[†] Reduced data package may be accepted

Table 3 Proposed permitted efficacy extrapolations for fruit diseases

Test organisms		Can extrapolate to		Notes		
Test crop	Target disease	Crop	Disease		N	S
Apple	Scab (<i>Venturia inaequalis</i>) (Data is required of control on fruit)	Pear	Scab (<i>Venturia pirina</i>)	Confirmatory data required	x	x
		Cherry, plum, peach	Scab (<i>Venturia</i> spp)	Confirmatory data required on one other crop.	x	x
Cherry or peach	Shot hole disease (<i>Stigmina carpophila</i>)	Plum, peach	Shot hole disease (<i>Stigmina carpophila</i>)		x	x
Apple or Pear	Powdery mildew (<i>Podosphaera leucotricha</i>)	Apple or Pear	Powdery mildew (<i>Podosphaera leucotricha</i>)	Confirmatory data required	x	x
Apple or Pear	Fruit tree canker (<i>Nectria galligena</i>)	Apple or Pear	Fruit tree canker	Confirmatory data required	x	x
Sour Cherry or Plum	Brown rot (<i>Monilia laxa</i>)	Sour Cherry, Sweet cherry or plum	<i>Monilia laxa, Monilia fructigena</i>		x	x
<i>Ribes</i> sp	All diseases	All other <i>Ribes</i> sp	The same disease		x	x
<i>Ribes</i> sp	Black currant leaf spot (<i>Drepanopeziza ribis</i>)	<i>Ribes</i> sp	Black currant leaf spot (<i>Blumeriella jaappii</i>), Mycosphaerella leaf spot (<i>Mycosphaerella ribis</i>)		x	x
Blackcurrants or Gooseberry	American gooseberry mildew (<i>Sphaerotheca mors-uvae</i>)	<i>Ribes</i> sp	Other powdery mildews		x	x
Blackcurrants or Gooseberry	American gooseberry mildew (<i>Sphaerotheca mors-uvae</i>)	Grapevine (where a minor crop)	<i>Uncinula necator</i>		x	
<i>Rubus</i> sp	All diseases	<i>Rubus</i> sp	The same disease		x	x
Blackberry or Raspberry	<i>Leptosphaeria coniothyrium</i>	Other <i>Rubus</i> sp	Septoria leaf spot (<i>Septoria rubi</i>)		x	x
			Cane spot (<i>Elsinoe veneta</i>)		x	x
Plums and Peach or apricots or almonds	All diseases	Peaches, plums, apricots, almonds.	The same disease	Data should normally be provided on at least two crop species.	x	x

Table 4 Proposed permitted efficacy extrapolations for vegetable diseases

Test organisms		Can extrapolate to	Notes		
Test crop	Target disease	Crop		N	S
Onion, Shallot	All diseases	Onion, shallot, salad onions, garlic, chives		x	x
Leek	White tip (<i>Phytophthora porri</i>)	Onion, shallot		x	x
Tomato	<i>Alternaria</i> sp, late blight (<i>Phytophthora</i> sp), <i>Botrytis</i> (<i>Botryotinia fuckeliana</i>)	Sweet pepper, chilli pepper, aubergine.		x	x
Cucumber	Gummy stem blight (<i>Didymella bryoniae</i>), Powdery mildew (<i>Sphaerotheca fusca</i> , <i>S. fuliginea</i> , <i>Erysiphe cichoracearum</i>), Downy mildew (<i>Pseudoperonospora cubensis</i>)	Other <i>cucurbitae</i>	May also extrapolate from <i>S. fusca</i> or <i>S. fuliginea</i> to other powdery mildews	x	x
Lettuce	<i>Botrytis</i> (<i>Botryotinia fuckeliana</i>)	Other leafy vegetables			x
Tomato or Cucumber	Damping off diseases caused by <i>Thanatephorus</i> spp or <i>Phytophthora</i> spp.	Other fruiting vegetables		x	x
Any vegetable seedling	Damping off diseases caused by <i>Pythium</i> sp	Any other vegetable seedlings		x	x
Vegetable brassicas	Rather than generating a full data set on one crop, data should be generated across a range of different crops including cabbages, a flowering type such as cauliflower or broccoli and either a leafy crop such as kale or Chinese cabbage or on Brussels sprouts. Extrapolation is then permitted to all brassicas.			x	x
Head Lettuce	Grey mould (<i>Botryotinia fuckeliana</i>), damping-off disease/Rhizoctonia. (<i>Thanatephorus cucumeris</i>), sclerotinia (<i>Sclerotinia minor</i> , <i>S. sclerotiorum</i>), downy mildew (<i>Bremia lactucae</i>)	Other lettuce forms, Endive, herbs, lambs lettuce		x	x
Chinese cabbage	Grey mould (<i>Botryotinia fuckeliana</i>), damping off (<i>Thanatephorus cucumeris</i>), <i>Phoma lingam</i>	Indian mustard, pak-choi, kohlrabi, radish.		x	x
Celery	Celery leaf spot (<i>Septoria apiicola</i>)	Celeriac, parsley, chervil, celery leaves.		x	x
Celery	Foliar diseases	Celeriac		x	x
Broad bean	Chocolate spot (<i>Botrytis fabae</i>)	Faba beans		x	x
Dwarf French/ Haricot bean (<i>Phaseolus vulgaris</i>)	<i>Botrytis</i> (<i>Botryotinia fuckeliana</i>),	Runner beans (<i>Phaseolus coccineus</i>) Edible podded peas (<i>Pisum sativum</i>)		x	x
	<i>Sclerotinia sclerotiorum</i>			x	x

Dwarf French/ Haricot bean (<i>Phaseolus vulgaris</i>)	<i>Sclerotinia trifoliorum</i> , <i>Colletotrichum</i> , <i>Ascochyta</i>	Broad bean (<i>Vicia faba</i>)		x	x
Dwarf French/ Haricot bean (<i>Phaseolus vulgaris</i>)	All diseases	Lentils		x	x
Artichoke (<i>Cynara scolymus</i>)	All diseases	Cardon (<i>Cynara cardunculus</i>)		x	

Table 5 Proposed permitted efficacy extrapolations for diseases of ornamentals

Disease	Test crop(s)	Test disease(s)	Notes	N	S
Fire (<i>Botrytis</i> blight)	Tulip	<i>Botrytis tulipae</i>	Some data on all three species required.	x	
	Lily	<i>Botrytis elliptica</i>		x	
	Gladiolus	<i>Botryotinia draytonii</i>		x	
Fusarium bulb rot	Tulip	<i>Fusarium oxysporum</i> f.sp. <i>tulipae</i>		x	
	Gladiolus	<i>F. oxysporum</i> f. sp. <i>gladiolus</i>		x	
<i>Pythium</i> root rot	Crocus or Iris and Hyacinth	<i>Pythium</i> sp	Tulips should also be tested if crops are to be forced	x	
				x	
Rhizoctonia	Tulip	<i>Rhizoctonia tuliparum</i>	Outdoor use only	x	
	Lily	<i>Rhizoctonia solani</i>		x	
Botrytis	one cut flower and one potted plant	<i>Botryotinia fuckeliana</i> on other ornamental flowers and bedding plants.	Protected crops	x	
Seedling diseases	Carnation or <i>Chrysanthemum morifolium</i> Saintpaulia, Begonia or Kalanchoe Saintpaulia or Gloxinia	<i>Pythium</i> spp.	Protected crops. Consistent results on all three diseases then extrapolation can be made to all seedling diseases	x	
		<i>Rhizoctonia</i> spp.		x	
		<i>Phytophthora</i> spp., <i>Pythium</i> spp.		x	
Powdery mildew	Rose (cut flower) Begonia (pot plant) <i>Saintpaulia</i> or potted chrysanthemum	<i>Sphaerotheca (Podosphaera) pannosa</i>	Consistent results on all three species will allow extrapolation to all powdery mildew species	x	
		<i>Microsphaera begoniae</i>		x	
		<i>Oidium</i> spp.		x	
Downy mildew	Lisianthus (<i>Eustoma russellianum</i>) Rose	<i>Peronospora chlorae</i>	Consistent results on both species will allow extrapolation to all downy mildew species	x	
		<i>Pseudoperonospora sparsa</i>		x	
<i>Phytophthora</i>	Saintpaulia or Rose	<i>Phytophthora nicotianae</i>	Consistent results on three crops and four species of <i>Phytophthora</i> (including <i>P. nicotianae</i> and <i>P. cryptogea</i>) will allow extrapolation to all <i>Phytophthora</i> species	x	
	Cyclamen	<i>Phytophthora capsici</i> , <i>Phytophthora cactorum</i> or <i>Phytophthora nicotianae</i>		x	
	Gerbera	<i>Phytophthora cryptogea</i>		x	
<i>Puccinia</i> sp	<i>Chrysanthemum morifolium</i>	<i>Puccinia horiana</i>	Tests should be on protected crops	x	
<i>Uromyces</i> sp	<i>Dianthus caryophyllus</i>	<i>Uromyces dianthi</i>	Tests should be on protected crops	x	

Table 6 Proposed permitted efficacy extrapolations for diseases of woody ornamentals, trees and forestry

Disease	Test crop(s)	Test disease(s)	Notes	N	S
<i>Colletotrichum</i> spp.	Lupine	<i>Colletotrichum</i> spp.	If all three diseases are tested claims can be extrapolated to all other fungal diseases in tree nursery crops and perennials	x	
<i>Phoma</i> spp.	Viburnum or Clematis	<i>Phoma viburni</i>		x	
<i>Septoria</i> spp.	Hebe or Veronica	<i>Septoria</i> spp.		x	
<i>Botrytis</i>	Any Conifer and heather	<i>Botrytis</i> spp	Consistent results on both test species will allow extrapolation to all species of woody ornamentals	x	
Powdery mildew	Rose rootstock	<i>Sphaerotheca pannosa</i>	Consistent results on both species will allow extrapolation to all species of woody ornamentals	x	
	<i>Quercus robur</i>	<i>Microsphaera alphitoides</i>)		x	
Downy mildew	<i>Rosa corymbifera</i> 'Laxa'	<i>Pseudoperonospora sparsa</i>	Consistent results on both species will allow extrapolation to all species of woody ornamentals	x	
	Alyssum	<i>Peronospora</i> sp		x	
<i>Phytophthora</i> spp	<i>Chamaecyparis</i>	<i>Phytophthora cinnamomi</i>		x	
Rusts	<i>Salix</i>	<i>Melampsora caprearum</i> and	Consistent results on both species will allow extrapolation to all species	x	
	<i>Hypericum</i>	<i>Melampsora hypericorum</i>		x	
<i>Sclerotinia</i> rot	<i>Skimmia</i>	<i>Sclerotinia</i> spp.		x	

INSECTICIDES

Table 7 Proposed efficacy extrapolations between different crop types for insecticides

Pest	From	To	Comments	N	S
Leatherjackets (<i>Tipula</i> spp).	Spray applications on cereals, beet and grass	Other crops e.g. peas, beans, oilseed rape	Same biology on different hosts	x	x
Soil insect pests : Wireworms (<i>Agriotes</i> spp) Cutworms (<i>Agrotis</i> spp) Chafers (<i>Melolontha</i> spp)	<i>Agriotes</i> spp. – any representative species <i>Agrotis</i> spp - any representative species <i>M. hippocastani</i> and <i>M. melolontha</i> each require data		For soil treatments results on one crop can be extrapolated to all other crops	x	x
<i>T. urticae</i>	Mites on hop, strawberry and tomato	Mites on runner beans and raspberry		x	x

Table 8 Proposed efficacy extrapolations for insecticides

Pest	Target Pest		Target Crop		N	S
	From	To	From	To		
ARABLE CROPS						
Aphids (virus transmission)	<i>Myzus persicae</i>	<i>Myzus ascalonicus</i> (not vice versa because virus transmission not as effective)	Sugar beet	Fodder beet	x	x
Aphids – sucking damage	<i>Sitobion avenae</i> , <i>Metopolophium dirhodum</i> , <i>Rhopalosiphum padi</i>	all cereal aphids if data on <i>R padi</i> plus one other species	Major cereals	Minor cereals	x	x
Extrapolation of pests from major to minor cereals may be possible provided pest biology and pest/crop interaction is comparable. An example where this is not possible is BYDV vectors from winter to spring barley because of significant differences in aphid movement and virus transmission through the crop.					x	x
FLOWER BULB AND BULB FLOWERS						
Stubby root nematodes	<i>Trichodorus</i> spp	<i>Trichodorus</i> spp in all flower bulb/tuber crops	Tulip or gladiolus	all flower bulb/tuber crops	x	
Root lesion nematode	<i>Pratylenchus penetrans</i>	<i>Pratylenchus penetrans</i> in all flower bulb/tuber crops	Narcissus or lily		x	
Aphids (virus transmission – various species)	Lily symptomless virus (LSV)	LSV in all flower bulb/tuber crops	Lily		x	
	Tulip breaking virus (TBV)	TBV in all flower bulb/tuber crops			x	
Aphids (sucking damage)	<i>Aphis gossypii</i> (hard to control)	Other aphid species	Lily		x	
Mites	<i>Rhizoglyphus echinopus</i> , <i>R. robini</i>	Bulb mites in all flower bulb/ tuber crops	Lily		x	
	<i>Eriophyes tulipae</i>	Curl mites in all flower bulb/ tuber crops	Tulip		x	

FLORICULTURE					N	S
Root lesion nematodes	<i>Pratylenchus</i> spp	Root lesion and burrowing nematodes	Rose or chrysanthemum	Other protected floriculture crops provided growing substrate the same. Pesticide efficacy can be affected by substrate e.g. higher on artificial than soil	x	
Burrowing nematodes	<i>Radopholus similis</i>	Burrowing and root lesion nematodes	<i>Anthurium andreanum</i>		x	
Root knot nematodes	<i>Meloidogyne</i> spp.	Root knot nematodes	<i>Bouvardia</i>		x	
Foliar nematode	<i>Aphelenchoides</i> spp.	Foliar nematodes	<i>Neprolepis</i> and chrysanthemum. Both species represent different leaf structures.		x	
Aphids	<i>Aphis gossypii</i> <i>Myzus persicae</i> <i>M. ascalonicus</i> <i>Macrosiphum rosae</i> <i>M. euphorbia</i> <i>Brachycaudus helichrysi</i>	Same species in other floriculture crops	<i>Chrysanthemum morifolium</i> or Hibiscus or Rose (Important floriculture crops sensitive to aphids)	Other floriculture or breeding/seed crops of arable and vegetables grown under protected conditions.	x	
					x	
					x	
					x	
					x	
					x	
	<i>A. gossypii</i> + 2 of above species (<i>A. gossypii</i> is most difficult to control of above species)	All species in floriculture crops.			x	
Leaf miner	<i>Liriomyza trifolii</i> (prevalent and hard to control)	<i>L. bryoniae</i> , <i>L. huidobrensis</i> , <i>chromatomyia syngenesiae</i> .	Gerbera or common chalkplant or <i>Dendranthema</i> (<i>Matthiola</i> not suitable because different leaf miner species found on this crop)	Other floriculture crops, nursery crops and perennials. Extrapolation possible to indoor and outdoor.	x	
Thrips	<i>Frankliniella occidentalis</i> . Hard to control because hidden in flower	<i>Thrips tabaci</i>	<i>Dendranthema</i> and <i>Saintpaulia</i>	Other floriculture, nursery crops, perennials, breeding/ seed arable and vegetable crops under protected conditions	x	
	<i>Echinothrips americanus</i>	Requires separate testing because less susceptible than other thrips species.	<i>Spathiphyllum</i> or <i>Dieffenbachia</i>		x	

Whitefly	<i>Bemisia argentifolii</i> Hard to control	<i>Trialeurodes vaporariorum</i> Confirmatory data required on <i>T vaporariorum</i> in those MS when <i>B argentifolii</i> is not indigenous	Poinsettia or Gerbera	Other floriculture, nursery crops, perennials, breeding/ seed arable and vegetable crops under protected conditions	x	
Mealybugs	<i>Pseudococcus citri</i> <i>P. maritimus</i>	Not possible to extrapolate to other species that are situated in waxy mass, unless product is systemic	Ficus and Kalanchoe	Other protected floriculture crops	x	
					x	
Spider mites	<i>Tetranychus urticae</i>	<i>Tetranychus</i> spp.	Cut flowers: rose or carnation or Dendranthema	Other cut flowers	x	
			Potted plants: Ficus or Hibiscus or Hedera	Other potted plants	x	
Tarsonemid mites	<i>Hemitarsonemus latus</i> or <i>Phytonemus pallidus fragariae</i>	Foliar Tarsonemid mites (i.e. excluding <i>Steneotarsonemus laticeps</i>)			x	
Scales	Coccidae e.g. : <i>Coccus hesperidum</i> <i>Saissetia coffeae</i> Diaspididae e.g. : <i>Aspidiotus hederae</i>	To claim 'scales' as a group, at least one species from each of Coccidae and Diaspididae			x	
					x	
					x	
					x	
					x	

TREE NURSERY AND PERENNIALS (OUTDOOR)					N	S
Root lesion nematodes	<i>Pratylenchus penetrans</i>	<i>Pratylenchus</i> spp.	Rose	Other tree nursery or perennials where nematodes found. Except can not extrapolate from anemone or peony to tree nursery crops	x	
Root knot nematodes	<i>Meloidogyne</i> spp.	<i>Meloidogyne</i> spp.	Any perennial species		x	
Foliar nematode	<i>Aphelenchoides</i> spp.	<i>Aphelenchoides</i> spp.	Anemone or peony		x	
Stem nematodes	<i>Ditylenchus dipsaci</i>	<i>Ditylenchus</i> spp.	Hosta or Phlox		x	
Aphids: <i>Aphis gossypii</i> <i>A. fabae</i> <i>Myzus persicae</i> <i>M. ascalonicus</i> <i>Macrosiphum rosae</i> <i>M. euphorbia</i> <i>Brachycaudus helichrysi</i> <i>Phyllaphis fagi</i>	One of named aphid species	All aphid species except <i>A. gossypii</i> and <i>P. fagi</i> . (Both of these are hard to control.)	Rose, Hibiscus Or Beech for Beech aphid (<i>P. fagi</i>)	Other tree nursery crops and perennials (and for Beech all Beech varieties)	x	
	<i>P. fagi</i>	Other aphid species except <i>A. gossypii</i>			x	
	<i>A. gossypii</i>	Other aphid species except <i>P. fagi</i>				x
Scale	<i>Parthenolecanium corni</i>	Other <i>Coccoidea</i> and <i>Diaspididae</i>	<i>Prunus laurocerasus</i>	Other tree nursery crops and perennials	x	
Weevils	<i>Otiorhynchus sulcatus</i>	Larvae to larvae of other <i>Otiorhynchus</i> spp. Adults to adults of other <i>Otiorhynchus</i> spp. and leaf eating weevils (<i>Phyllobius</i> and <i>Polydrusus</i> sp.)	Rhododendron (adults) and Thuja (larvae)	Other tree nursery crops and perennials	x	
Caterpillars	One species of Tortricid e.g. <i>Cacoecimorpha pronubana</i>	All Tortricidae (leaf rollers)	Betula or other deciduous tree	Other tree nursery crops and perennials	x	
	<i>Orthosia</i> spp.	All non tortricid caterpillars on that crop	Betula or Salix		x	

Thrips	<i>Thrips fuscipennis</i>	Other thrips except <i>F. occidentalis</i> because it is hard to control	Rose	Other tree nursery crops and perennials	x	
Bugs	<i>Lygus pabulinus</i>	Other species of bugs (Miridae)	Forsythia	Other tree nursery crops and perennials	x	
Mites	<i>Taxus</i> bud mite or <i>Buxus</i> bud mite	Other bud mites	Buxus or Taxus	Other tree nursery crops and perennials	x	
	<i>Aculus fockeui</i> Plum rust mite	Other rust mites	Prunus		x	
Spider mites. No extrapolation between spp., but if control on all 4 then can extrapolate to all spider mite spp.	<i>Tetranychus urticae</i>	<i>Tetranychus</i> spp.	Callicarpa	Other tree nursery crops and perennials	x	
	<i>Panonychus ulmi</i>	<i>Panonychus</i> spp.	Malus or Sorbus		x	
	<i>Eotetranychus tillarum</i>	<i>Eotetranychus</i> spp.	Lime tree		x	
	<i>Oligonychus ununguis</i>	<i>Oligonychus</i> spp.	Chamaecyparis		x	
EDIBLE MUSHROOMS						
Gall midge	<i>Mycophila speyeri</i>	<i>Heteropeza pygmaea</i>	Cultivated mushroom	Can not extrapolate to other edible mushrooms because different application timings and cultivation methods	x	
Mite	<i>Tyrophagus putrescentiae</i>	<i>Siteroptes mesembrinae</i> , <i>Pygmephorus sellnick</i> , <i>Lupotarsonemus mycelliophagus</i>			x	
FRUIT (AND NUT) GROWING CROPS						
Aphids	<i>Dysaphis plantaginea</i> (Rosy apple aphid) and <i>D. devector</i> (rosy leaf curling aphid)	<i>D. anthrisci</i> , <i>D. pyri</i> , <i>Rhopalosiphum insertum</i> , <i>R. ribesinus</i> , <i>Myzus persicae</i> , <i>M. cerasi</i> , <i>Amuraphis farfarae</i> , <i>Aphis fabae</i> , <i>A. pomi</i> , <i>A. idaei</i> , <i>A. ruborum</i> , <i>A. schneideri</i> , <i>Melanaphis pyaria</i> , <i>Sitobion fragariae</i> , <i>Amphorophora rubi</i> , <i>A. idaei</i> , <i>Brachycaudus prunicola</i> , <i>B. helichrysi</i> , <i>Hyperomyzus lactucae</i> , <i>Nasonovia ribisnigri</i> , <i>Hyalopterus amygdali</i> , <i>H. pruni</i>	Apple	Pear, (confirmatory data on <i>D. pyri</i> on pear required) blackcurrant, redcurrant, white currant, gooseberry, blackberry, raspberry, cherry, peach (confirmatory data on <i>Myzus persicae</i> required), plum and fruit tree cultures of apple and pear. Care should be taken when extrapolating between trees and shrubs (e.g. differences in crop structure may affect target dose).	x	x
	<i>Aphis pomi</i> Green apple aphid	<i>Sitobion fragariae</i> , <i>Aphis idaei</i> , <i>A. ruborum</i> , <i>A. fabae</i> , <i>Myzus persicae</i> , <i>Amphorophora rubi</i> , <i>Rhopalosiphoninus ribesinus</i> ,			x	x

Aphids (cont.)	<i>Aphis spiraecola</i>	Not possible, known to be less sensitive species			x	
	<i>Eriosoma lanigerum</i>	Not possible. Difficult to control due to wax coat			x	
	<i>Cryptomyzus ribis</i>	Not possible	Redcurrant	Blackcurrant, white currant, gooseberry	x	
	<i>Rhodobium porosum</i> or <i>Aphis gossypii</i>	<i>Chaetosiphon fragaefolii</i> , <i>Aphis gossypii</i> , <i>A. fabae</i> , <i>Fimbriaphis fimbriata</i> , <i>Nasanovia ribis-nigri</i> , <i>Myzus ascalonicus</i>	Strawberry (protected)	Strawberry (outdoor)	x	
Tortrix	<i>Adoxophyes orana</i> as less susceptible than other tortrix. If one additional species, then can extrapolate to whole group	<i>Archips podana</i> , <i>A. rosana</i> , <i>Pandemis heparana</i> , <i>Heyda dimidioalba</i> , <i>Clepsis spectrana</i>	Apple	Pear	x	x
			Fruit growing cultures	Tree nursery crops, perennials and public greens	x	
Fruit moth	<i>Cydia pomonella</i>	<i>Cydia funebrana</i>	Apple	Pear and plum (confirmatory data on <i>Cydia funebrana</i> required)	x	x
			Fruit growing cultures	Tree nursery crops, perennials and public greens	x	x
Clearwing caterpillars	<i>Synanthedon myopaeformis</i>	<i>S. tipuliformis</i>	Apple	Red-, white-, black-currant, gooseberry, apple fruit tree cultures and rootstocks	x	x
Clouded drab moth or Winter moth	<i>Orthosia spp.</i> or <i>Operophtera brumata</i>	<i>Operophtera brumata</i> or <i>Orthosia spp</i>	Apple or pear	Apple, Pear, cherry, Plum, blueberry, peach	x	x
			Apple and pear	Tree nursery crops, perennials, public greens	x	x
Psyllids (virus/phytoplasm transmitting psyllids should be tested separately)	<i>Cacopsylla pyricola</i> ,	<i>C. mali</i> (less common and more susceptible to pesticides).	Pear	Apple	x	x
Leafhoppers	<i>Macropsis fuscula</i> or <i>Edwardsiana rosae</i>	<i>E. rosae</i> , <i>E. crataegi</i> , <i>Empoasca vitis</i> , <i>M. fuscula</i>	Raspberry or apple	Apple (including fruit tree cultures and rootstocks) or raspberry	x	x

Leaf Midges	<i>Dasineura tetensi</i>	<i>D. mali</i> , <i>D. pyri</i> . Biology of all 3 species similar. Extrapolation ONLY for systemic products. Raspberry cane midge, pear midge and <i>R. oculiperda</i> have different biology and each needs own data.	Redcurrant, white currant or blackcurrant	Redcurrant, white currant or blackcurrant, apple, pear, gooseberry	x	x
Scale	<i>Lepidosaphes ulmi</i>	<i>Quadraspidiotus ostreaeformis</i>	Apple	Pear and fruit tree cultures/ rootstocks, of apple and pear	x	x
Thrips	<i>Frankliniella occidentalis</i>	<i>Thrips tabaci</i> , <i>T. fuscipennis</i>	Strawberry (protected)	Strawberry (outdoor), blackberry, raspberry, grapes, peach (protected)	x	x
Bugs	<i>Lygocoris pabulinus</i>	<i>Campylomma verbasci</i> , <i>Atractotomus mali</i>	Apple or redcurrant	Redcurrant, apple, blackcurrant, gooseberry, blackberry, raspberry, white currant, strawberry, fruit tree cultures/rootstocks of apple and pear	x	x
Bud mites	<i>Cecidophyopsis ribis</i>	<i>Phytoptus avellanae</i>	Blackcurrant	Redcurrant, white currant, gooseberry, hazel	x	x
Rust mites	<i>Phyllocoptes schlechtendali</i> or <i>Epitremesius pyri</i>	<i>E. pyri</i> , <i>P. schlechtendali</i> , <i>P. fockeui</i> , <i>P. gracillis</i>	Apple or pear	Pear, apple, plum, raspberry	x	x
Spider mites (extrapolation between these species is not possible).	<i>Tetranychus urticae</i>	<i>T. urticae</i> in other crops, <i>T. viennensis</i>	Apple	Cherry, pear, plum, redcurrant, blackcurrant, white currant, gooseberry, blackberry, raspberry, vine, strawberry	x	x
	<i>Panonychus ulmi</i>	<i>P. ulmi</i> in other crops, <i>Bryobia rubrioculus</i>		Cherry, pear, plum, fruit tree cultures/ rootstocks of apple and pear	x	x
	<i>Bryobia ribis</i>	<i>B. ribis</i> in other crops		blackcurrant, white currant, gooseberry, blackberry, raspberry	x	x

VEGETABLE AND HERBS (OUTDOOR)					N	S
Cutworms	<i>Agrotis spp</i>	<i>Agrotis spp</i> (no difference in species sensitivity)	Endive	Lactuca sativa spp, lamb's lettuce, fennel	x	x
			Iceberg lettuce	Endive, Lactuca sativa spp, lamb's lettuce, fennel	x	x
Flea beetles	<i>Phyllotreta cruciferae</i>	Other <i>Phyllotreta spp.</i>	Radish	Gherkins, cauliflower, broccoli, kale, black radish, beetroot, head cabbage, Brussels sprouts	x	x
Leaf aphids (except cabbage aphid)	<i>Nasonovia ribisnigri</i> Common and most harmful. Also lives deep in the heart of the crop	<i>Macrosiphum euphorbiae</i> , <i>Aulacorthum solani</i> , <i>Uroleucon sonchi</i>	Iceberg lettuce	Wide range of listed crops. If test on both iceberg lettuce and Chinese cabbage can extrapolate to all vegetables except carrots	x	x
	<i>Myzus persicae</i>	<i>Aphis fabae</i> , <i>N. ribisnigri</i> (but NOT on iceberg lettuce), other leaf aphids in herbs	Chinese cabbage (most susceptible)		x	x
Cabbage Aphid	<i>Brevicoryne brassicae</i> (hardest to control in Brussels sprouts)	Not to other species	Brussels sprouts	Range of brassicas	x	x
Swede midge	<i>Contarinia nasturtii</i>	Broccoli (Damage severe because several growing points)	Broccoli	Brussels sprouts, cauliflower, Chinese and head cabbage	x	x
Wireworms	<i>Agriotes spp.</i>	Other <i>Agriotes spp.</i>	Endive, lettuce	As before plus + Lactuca sativa spp.	x	x
Caterpillars	<i>Plutella xylostella</i> (hardest to control) + one other species e.g. <i>Mamestra brassicae</i>	<i>Pieris spp</i> , <i>Clepsia spectrana</i> , <i>Mamestra spp</i> , <i>Evergestis forficalis</i>	Cauliflower or head cabbage	Range of brassicas	x	x
	<i>Autographa gamma</i>	Not to other species	Endive, swede, head/Iceberg lettuce	As before + Lactuca sativa spp., herbs	x	x
Thrips	<i>Thrips tabaci</i>	Not possible.	Seed onion	Onions, shallots, garlic. Not to leeks or head cabbage because larvae hide away.	x	x

			White cabbage	Red, Savoy and head cabbage, Brussels sprouts, cauliflower, broccoli	x	x
Mites	<i>Tetranychus urticae</i>	Not possible	Bean	Other beans, gherkin, courgette, patisson	x	x
Slug	<i>Deroceras reticulatum</i> plus <i>Arion</i> species	All slugs	Cauliflower, broccoli, head lettuce, head cabbage	As before + endive, <i>Lactuca sativa</i> spp.	x	x

VEGETABLE AND HERBS (PROTECTED)						
Aphids: <i>Macrosiphum euphorbiae</i> <i>Aulacorthum solani</i> ; <i>Myzus persicae</i> <i>Nasonovia ribisnigri</i> <i>Aphis gossypii</i> <i>Aphis fabae</i>	One species	Same species in other protected crops	Cucumber	Wide range of vegetables, herbs, and breeding/seed arable and vegetable crops	x	x
	<i>A. gossypii</i> + two other species	All aphid species			x	x
Leafminers	<i>Liriomyza bryoniae</i>	<i>L. bryoniae</i> in other crops	Tomato	Wide range of vegetables and herbs	x	x
	<i>L. trifolii</i> (frequent and hardest to control)	<i>L. trifolii</i> , <i>L. huidobrensis</i> , <i>L. bryoniae</i> , <i>Chromatomyia syngenesiae</i> in other crops			x	x
	<i>L. huidobrensis</i>	<i>L. huidobrensis</i> in other crops			x	x
Thrips	<i>Frankliniella occidentalis</i> (hidden habit)	<i>Thrips tabaci</i> , <i>T. fuscipennis</i>	Aubergine or sweet pepper (crops where thrips are hidden)	Wide range of herbs, vegetables, and seed/ breeding arable and vegetable crops	x	x
	<i>Echinothrips americanus</i>	Not possible. Lives on leaves and is less susceptible to pesticides			x	x
Whitefly	<i>Bemisia argentifolii</i> (<i>B. tabaci</i>)	<i>Trialeurodes vaporariorum</i>	Aubergine or cucumber	Vegetables, herbs, and breeding/seed arable and vegetable crops	x	x
Mites	<i>Tetranychus urticae</i>	<i>T. urticae</i> in other crops	Aubergine (big hairy leaves which make it difficult to control mites)	Wide range vegetables, and breeding/seed arable and vegetable crops	x	x

SEED PRODUCTION						
Can extrapolate from regular crop production to seed production of the same crop because the methods of treatment and levels of infestation do not differ.					x	
SEED TREATMENTS						
Collembola	<i>Onychiurus armatus</i> (common, most important species)	<i>Collembola</i> spp.	Sugar beet (sowing density makes it susceptible)	Fodder and red beet	x	
Any pest of seedlings	-	-			x	
STORED GRAIN						
Stored pests: Field and laboratory data for <i>Oryzaphilus surninamensis</i> and/ or <i>Sitophilus granarius</i>	<i>Oryzaphilus surninamensis</i> and/or <i>Sitophilus granarius</i>	<i>Tribolium</i> spp. and <i>Cryptolestes ferrugineus</i> if laboratory data show similar mortality to <i>O. surninamensis</i> and/or <i>Sitophilus granarius</i> .	any stored cereal grain	any stored cereal grain	x	

VITICULTURE					
Spider mites (Tetranychidae)	<i>Panonychus ulmi</i> ,	The other species providing one species is tested			
	<i>Tetranychus urticae</i>				x
Gall mites (Eriophyidae)	<i>Calepitrimerus vitis</i> , <i>Eriophyes vitis</i>	The other species providing one species is tested			x
Sucking pests Bugs Scales	Leafhoppers(<i>Empoasca vitis</i>), (<i>Scaphoideus titanus</i>)	To claim all sucking pests, 1 species of leafhopper and two species from the other groups			x
	Thrips (<i>Drepanothrips reuteris</i>), <i>Thrips tabaci</i>				x
	Bugs (<i>Lygus</i> spp).				x
	Scales (<i>Pulvinaria</i> spp), (<i>Parthenolecanium</i> spp)				x
Biting pests	Lepidoptera: <i>Peribatodes rhomboidaria</i> <i>Operophtera brumata</i> <i>Mamestra</i> spp, <i>Cnephasiella pasivana</i> <i>Clepsis spectrana</i> <i>Ostrinia nubilalis</i> <i>Argyrotaenia ljugiana</i> Chafers : <i>Melolontha</i> spp Weevils: <i>Byctiscus betulae</i> <i>Otiorhynchus ligustici</i> , <i>O. sulcatus</i> , <i>Peritelus griseus</i> <i>Tanymecus palliastus</i>	To claim all biting pests, 3 species including 1 weevil and 1 noctuid moth (<i>Mamestra</i>). In addition specific data required on : <i>Dactylosphaera vitifolii</i> <i>Eupoecilia ambiguella</i> <i>Lobesia botrana</i> <i>Sparganothis pilleriana</i>			x
Chafers	<i>Melolontha melolontha</i>	<i>Rhizotrogus aestivus</i> , <i>Polyphylla fullo</i> , <i>Anomala</i> spp.			x
Nematodes	<i>Xiphinema</i> spp.	<i>Meloidogyne</i> sp, <i>Longidorus</i> spp.			x

HERBICIDES

Table 9 Extrapolations between crops for the same target weed

Test crop:	Can extrapolate to:	N	S
Pre-emergence, pre-sowing or pre-planting application of one crop	Pre-emergence, pre-sowing or pre-planting application of another crop (only if growing conditions are the same).	x	
Any drilled flower, tree nursery or perennial crop.	Planted crop of the same species	x	
Any planted flower, tree nursery or perennial crop.	Drilled crop of the same species	x	
Any non-competitive crop e.g. Orchards, HONS, amenity vegetation, land not intended to bear vegetation.	Any other non-competitive crop, poorly competitive crop e.g. Sugar beet, peas, onions, linseed, horticultural brassicas, or competitive crop e.g. Cereals, grassland, oilseed rape (contact herbicides only)	x	
Any poorly competitive crop e.g. Sugar beet, peas, onions, linseed, horticultural brassicas	Any other poorly competitive crop or competitive crop e.g. Cereals, grassland, oilseed rape (contact herbicides only)	x	
Any competitive crop e.g. cereals, grassland, oilseed rape	Any other competitive crop (contact herbicides only)	x	
Outside open field culture of tulip, narcissus or hyacinth (spring flowering crops)	Outside and protected cultures in open field of other spring flowering flower bulb- and bulb flower crops	x	
Outside open field culture of lily or gladiolus (summer flowering crops)	Outside and protected cultures in open field of other summer flowering flower bulb- and bulb flower crops	x	
Protected culture of bulb flowers in trays or containers (contact herbicide only)	Protected open field culture of bulb flowers (contact herbicide only)	x	
Protected open field culture of bulb flowers (contact herbicide only)	Protected culture of bulb flowers in trays or containers (contact herbicide only)	x	
Outside open field culture of flower bulb culture	Outside open field culture of bulb flower culture	x	
Outside open field culture of bulb flower culture	Outside open field culture of flower bulb culture	x	
Newly sown grass	Established grass (except where target weed is a perennial weed that is beyond the seedling stage)	x	

Table 10 Extrapolations between different target weeds

FAMILY	Test species	Can extrapolate to:	N	S
<i>Caryophyllaceae</i>	<i>Stellaria media</i> (Common chickweed).	<i>Silene alba</i> , (White campion) <i>Arenaria serpyllifolia</i> (Thyme-leaved sandwort) <i>Cerastium fontanum</i> (Common mouse-ear)	x	x
<i>Chenopodiaceae</i>	<i>Chenopodium album</i> (Fat hen)	<i>Atriplex patula</i> (Common orache) <i>Chenopodium ficifolium</i> (Fig-leaved goosefoot)	x	x
<i>Compositae</i>	<i>Cirsium arvensis</i> (Creeping thistle) <i>Matricaria spp</i> ¹ (Mayweeds) <i>Senecio vulgaris</i> (Groundsel) <i>Sonchus spp</i> (Sow thistles).	<i>Crepis spp</i> (Hawkweeds) <i>Lapsana communis</i> (Nipplewort) <i>Corrigiola litoralis</i> (Strapwort) (support may also be derived from data on members of the caryophyllaceae)	x	x
<i>Cruciferae</i>	<i>Brassica napus</i> (volunteer Oilseed rape) <i>Capsella bursa-pastoris</i> (Shepherd's-purse), <i>Sinapis arvensis</i> (Charlock),	<i>Raphanus raphanistrum</i> (Wild radish) <i>Thlapsi arvense</i> (Field penny-cress) <i>Arabidopsis thaliana</i> (Thale cress) <i>Descurainia sophia</i> (Flixweed) <i>Iberis amara</i> (wild candytuft),	x	x
<i>Geraniaceae</i>	<i>Erodium cicutarium</i> (Common stork's-bill) <i>Geranium dissectum</i> (Cut-leaved cranes-bill) <i>G. molle</i> (Dove's-foot crane's-bill)		x	
<i>Labiatae</i>	<i>Lamium purpureum</i> (Red dead-nettle)	<i>Lamium amplexicaule</i> (Henbit dead-nettle),	x	x
<i>Papaveraceae</i>	<i>Fumaria officinalis</i> (Common fumitory) <i>Papaver rhoeas</i> (Field poppy)		x	

FAMILY	Test species	Can extrapolate to:	N	S
<i>Polygonaceae</i> *	<i>Polygonum aviculare</i> (Knotgrass), <i>Fallopia convolvulus</i> (Black bindweed), <i>P. lapathifolium</i> (Pale persicaria), <i>P. persicaria</i> (Redshank)		x	
<i>Scrophulariaceae</i> ²	<i>Veronica persica</i> (Field speedwell) <i>V. hederifolia</i> (Ivy-leaved speedwell)	<i>Veronica arvensis</i> (Wall speedwell),	x	x
<i>Solanaceae</i>	<i>Solanum tuberosum</i> (Volunteer potato) <i>Solanum nigrum</i> (Black nightshade)		x	
<i>Violaceae</i>	<i>Viola arvensis</i> (Field pansy)	<i>Viola tricolour</i> (Wild Pansy)	x	x

* This is a diverse family and some data should be provided from any member claimed unless there is very full support from other members of the family.

¹ Mayweeds must have individual species data provided unless activity can be shown across a range of species.

² There can be variability in response to this family, particularly in the sulfonylureas. Where this is found with an active, then full supporting data will be needed on each member of the family.

As noted in the introduction this is a framework for evaluators and it should be used alongside expert judgement and regulatory experience.

Plant growth regulators

No proposals for the extrapolation of plant growth regulators were received.

CROP SAFETY

Table 11 Reference sensitive ornamental species

Cut flowers	Potted plants
- <i>Lisianthus (Eustoma)</i>	<i>Fuchsia</i>
- Rose (<i>Rosa</i>)	<i>Begonia</i>
- <i>Dendranthema (chrysanthemum)</i>	<i>Ficus benjamina</i>
- <i>Gerbera</i>	<i>Saintpaulia</i>
- Carnation (<i>Dianthus</i>)	<i>Exacum</i>
- Common chalkplant (<i>Gypsophila</i>)	<i>Cyclamen</i>

Table 12 Extrapolation of crop safety for seed treatments

From:	To:
Sugar beet	Fodder beet, red beet, spinach beet
Maize for silage	Sweet corn, kernel maize
Sweet corn	Maize for silage, kernel maize
Winter barley	Spring barley, oat
Spring barley	Winter barley, oat
Winter wheat	Spring wheat, winter rye, spring rye, triticale, spelt
Spring wheat	Winter wheat, winter rye, spring rye, triticale, spelt
Peas, dry harvesting	Pod, garden pea and other <i>Pisum sativa</i> spp.
Seed onion	1 st year onion set, silver skin onion, pickles, seed shallot, bunched onion, chives, Chinese chives, leek
1 st year onion set	Seed onion, silver skin onion, pickles, seed shallot, bunched onion, chives, Chinese chives, leek
Silver skin onion	Seed onion, 1 st year onion set, pickles, seed shallot, bunched onion, chives, Chinese chives, leek
Pickles	Seed onion, 1 st year onion set, silver skin onion, seed shallot, bunched onion, chives, Chinese chives, leek
Seed shallot	Seed onion, 1 st year onion set, silver skin onion, pickles, bunched onion, chives, Chinese chives, leek
Leek	Seed onion, 1 st year onion set, silver skin onion, pickles, seed shallot, bunched onion, chives, Chinese chives
English ryegrass	Italian rye grass, smooth-stalked meadow grass, red fescue, <i>Lolium</i> spp., <i>Agrostis</i> spp, <i>Phalaris</i> spp, <i>Phleum arenarium</i> and other grass species
Lupin, blue	Lupin yellow and white
White clover	other <i>Trifolium</i> species, black medick, white sweet clover, <i>Lotus</i> spp, lucerne

From:	To:
Poppy seed	no possibilities for extrapolation
Flax	no possibilities for extrapolation
Buckwheat	no possibilities for extrapolation
Tomato	Egg plant, sweet pepper, Chilli pepper
Gherkin	Cucumber, Courgette, pumpkin, melon, water melon
Spinach	Lamb's lettuce
Heading lettuce	all <i>Lactuca</i> species, dandelion salad
Witloof	Chicory, endive, cardoon, sugar loaf and red-leaved chicory
Spring carrot	Winter carrot, celery, celeriac, blanched celery, fennel, parsley, caraway, dill and wild carrot
Winter carrot	Spring carrot, celery, celeriac, blanched celery, fennel, parsley, caraway, dill and wild carrot
Radish	Black radish, wild radish
Cauliflower	Broccoli, red cabbage, white cabbage, pointed head cabbage, Savoy cabbage, Brussels sprouts, Chinese cabbage, kohlrabi, kale, Indian mustard, pak-choi, turnip, rapeseed (incl. summer rapeseed), Swedes, Swedish turnip, <i>Brassica napus</i> spp., <i>Brassica rapa</i> var. <i>rapa</i> , crambe, <i>Sinapsis alba</i>
Dwarf snap bean	Dwarf slicing bean, pole snap bean, pole slicing bean, dwarf French bean (<i>Phaseolus vulgaris</i> spp.), runner bean, broad bean (<i>Vicia faba</i> spp.), common vetch, hairy vetch

Table 13 Extrapolations for crop safety of fungicides and insecticides (including molluscicides, acaricides and nematicides)

From	To	Additional comments
FRUIT		
One of red, white or black currants	Redcurrant, whitecurrant, blackcurrant	
Strawberry (protected)	Strawberry (outdoor)	
Raspberry	Blackberry	
Apple	fruit tree cultures and fruit tree rootstocks of apple	
Pear	fruit tree cultures and fruit tree rootstocks of pear	
Sweet cherry	Sour cherry, peach and plum	Cherry is more susceptible for phytotoxicity than peach and plum. Sweet cherry is more susceptible than sour cherry.
Gooseberry, blackberry and plum		These crops are less susceptible to phytotoxicity and therefore are generally not appropriate crops to extrapolate from.
GRASS		
Young grassland	Older grassland of the same named mixture	
EDIBLE MUSHROOMS		
None	None	For fungicides it is necessary to conduct specific crop safety trials on each mushroom species. Extrapolation to other edible mushrooms is not possible. For insecticides, xtrapolation between mushroom species is possible.

ARABLE		
One of industrial, ware or seed potato	Industrial, ware and seed potato	Based on practical experiences. Some information on safety to daughter tubers will be required.
Sugar beet	Fodder beet, red beet	
Winter wheat	Spring wheat, triticale, spelt, winter & spring barley	
Spring wheat	Winter wheat, winter & spring barley,	
Winter barley	Spring barley	
Spring barley	Winter barley	
Smooth-stalked meadow grass or Red fescue or English ryegrass	Smooth-stalked meadow grass, English ryegrass and red fescue	Extrapolation is only possible for the direct crop phytotoxic symptoms. Extrapolation is not possible for germination or yield.
FLOWER BULBS and BULB FLOWERS		
Tulip and lily and gladiolus	All other flower bulb and flower tuber crops and bulb flowers	Tulip and lily are more sensitive than gladiolus. However, specific tests on Narcissus are required for bulb dipping treatments against <i>Fusarium oxysporum</i> as narcissus is dipped in warm water. Extrapolation from forcing culture to open field culture is possible when no yield trials of open field culture are necessary. If a soil treatment as well as a dip treatment is claimed, trials should be conducted on both ways of application. Extrapolation from production to forcing culture is not possible because of the shorter duration of the culture.
Tulip and lily and gladiolus	All other flower bulb and flower tuber crops and bulb flowers where <u>non-persistent viruses occur</u> or where sucking damage by aphids occurs	Extrapolation from a single test crop to other crops is not possible.
Outdoor Crocus	Iris	Hyacinth is the most susceptible, followed by tulip and then lily. Iris is less sensitive. Extrapolation from outdoor production to forcing culture

Outdoor Hyacinth	All flower bulb and flower tuber crops and bulb flowers	or vice versa is not possible. Extrapolation is possible from substrate treatment to soil treatment in the forcing culture, but not vice versa.
Forced Tulip	Iris and Lily	
SEED CROPS		
Regular production	Seed production of the same crop	Extrapolation is only possible for crop damage such as stunting or necrosis. Safety to the seed itself (eg, germination) must be assessed separately unless there is considerable practical experience that no adverse effect is likely.
OUTDOOR VEGETABLES		
(Head cabbage includes: red cabbage, white cabbage, Savoy cabbage and pointed head cabbage. <i>Lactuca sativa</i> spp. includes: head lettuce, iceberg lettuce, oak-leaf lettuce, Lollo Rosso, Lollo bionda, curled lettuce, leaf lettuce and cos lettuce).		
Cauliflower	Broccoli, kale, head cabbage, Brussels sprouts, swede, kohlrabi	
Head cabbage	Brussels sprouts	
Broccoli	Head cabbage, cauliflower, kale, Brussels sprouts	Extrapolation to protected breeding and seed production of cabbage is not possible.
		Extrapolation from protected floriculture or vegetable culture to protected breeding and seed production is possible.
Brussels sprouts	Kale, head cabbage	
Indian mustard or Pak-choi cabbage	Indian mustard, Pak-choi cabbage, cauliflower, Brussels sprout, broccoli, kale, Chinese cabbage	
Winter carrot	Bunched carrots and washed carrots, blanched celery, celeriac, fennel and parsnip	

Head lettuce	endive, blanched celery, Chinese cabbage and <i>Lactuca sativa</i> spp., fresh herbs, swede, broccoli, Cauliflower, head cabbage	Extrapolation from head lettuce to gherkin is not acceptable.
Iceberg lettuce	Endive, <i>Lactuca sativa</i> spp., lamb's lettuce and fennel	For soil treatments
Radish	Cauliflower, broccoli, kale, beetroot, black radish, head cabbage and Brussels sprouts	Extrapolation to gherkins is not possible. Gherkins are more sensitive than radish. Cabbage crops have a wax layer and are therefore less sensitive.
Black radish	Radish	
Gherkins	Cauliflower, broccoli, kale, beetroot, radish, black radish, head cabbage and Brussels sprouts	Gherkins are susceptible to phytotoxicity as the crop has big leaves and few roots. This increases the chance of phytotoxicity. Cabbage crops have a wax layer and are therefore less sensitive.
Celery	Celeriac, parsley, chervil, celery leaves	Celery is more sensitive than celeriac.
Onion	Seed onions, 2 nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic	There are no differences in sensitivity between the several onion and shallots species so extrapolation to all onion species is possible. Extrapolation to protected breeding and seed production of onion is not possible.
Seed onion or 1 st year set		Extrapolation from protected floriculture or vegetable culture to protected breeding and seed production is possible.
Onion 2 nd year set	Seed onions, seed shallots, planted shallots	
Leek	Seed- and planted shallots, bunched onion, seed onion, 1 st and 2 nd year set, silver skin onion, pickles and garlic	Leek is more sensitive than the other crops.
Broad bean	other Faba (<i>Vicia</i>) beans	
Bean (<i>Phaseolus vulgaris</i>)	Pole snap bean, runner bean, dwarf slicing bean, pole slicing bean, sugar	

	pea and snap bean	
Bean	other beans (<i>Phaseolus</i> spp.)	
(<i>Phaseolus</i> spp.)		
PROTECTED VEGETABLES		
General comments	If extrapolation is possible to a group of crops, the following crops are included:	
	- <i>Cucurbitaceae</i> : gherkin, courgette, cucumber, gourd, melon, patisson, pumpkin and squash	
	- <i>Solanaceae</i> : eggplant, tomato, sweet pepper and Chile pepper	
	- <i>Lactuca sativa</i> spp.: head lettuce, iceberg lettuce, oak-leaf lettuce, Lollo Rosso, Lollo bionda, curled lettuce, leaf lettuce and cos lettuce.	
	Extrapolation is not possible from <i>Cucurbitaceae</i> to <i>Solanaceae</i> or vice versa	
	Extrapolation to field production is not possible unless mentioned explicitly.	
Cucumber	other <i>Cucurbitaceae</i> (indoor and outdoor) and other vegetables with the exception of <i>Lactuca</i> spp. and endive	Cucumber is most susceptible for phytotoxicity of the group <i>Cucurbitaceae</i> . The results can be used for extrapolation to French bean, runner bean, slicing bean and other vegetables not belonging to the group of fruit-vegetables with exception of <i>Lactuca</i> spp and endive.
Cucumber	protected breeding and seed production of arable and vegetable crops	It is vital that the application of a product does not reduce germination of the seed. Extrapolation is not possible from cropping culture. It is necessary to specifically test the influence of the product on germination unless there is considerable (practical) experience that the product has no adverse effect on germination.
Eggplant (and tomato or sweet pepper)	other <i>Solanaceae</i> .	Eggplant is the most sensitive of the <i>Solanaceae</i> . However part of the testing can be conducted in tomato or sweet pepper.
Head lettuce	Endive, <i>Lactuca</i> spp and fresh herbs	Head lettuce is more sensitive than iceberg lettuce and endive

Broccoli	Cauliflower	Broccoli is the most suitable test crop in phytotoxicity trials. The main bud is harvested first and when the tested product comes in contact with the wound where the main bud was cut off, phytotoxicity may occur.
Broccoli	Protected breeding and seed production of cabbage crops	It is vital that the application of a product does not reduce germination of the seed. Extrapolation is not possible from cropping culture. It is necessary to specifically test the influence of the product on germination unless there is considerable (practical) experience that the product has no adverse effect on germination.
Parsley	Parsley, chervil, celery leaves (indoor and outdoor)	
Chinese cabbage	Indian mustard, pak-choi cabbage and kohlrabi.	
Black radish	Radish	

Table 14 Extrapolations of crop safety for herbicides

From	To	Additional comments
FRUIT		
Nursery crops of the same crops which are used as wind breaks	Wind breaks	
Apple, cherry, plum	Tree nuts	Application to orchard floor only and mode of action of herbicide should be considered.
Almond or chestnut or hazelnut or walnut	All tree nuts	Application to orchard floor only and mode of action of herbicide should be considered.
Apple or pear	Quince, crab apples.	Application to orchard floor only and mode of action of herbicide should be considered.
Peach	Nectarine, apricot	Application to orchard floor only and mode of action of herbicide should be considered.
Strawberry runner production	Strawberry production culture or selection fields, extrapolation vice versa is also possible	
Raspberry or blackberry (protected conditions)	Raspberry, blackberry Dewberry, <i>Rubus</i> spp in open field culture	Extrapolation is possible from raspberry to blackberry because raspberry is more susceptible to phytotoxicity.
Young plantation of a crop (soil acting herbicides only)	Established plantation of the same crop (soil herbicides only)	
Apple and pear	Culture of rootstocks and fruit trees.	
White currant or red currant or black currant or gooseberry	White currant, red currant, black currant and gooseberry	Black-, white- and red-currant are more susceptible to phytotoxicity than gooseberry. For that reason extrapolation from gooseberry to black currant, white currant and red currant is not possible. Extrapolation from other currant species to blueberry (<i>Vaccinium</i> sp.) and vice versa is not possible.

GRASS		
Young grassland	Older grassland of the same named mixture	
Grass for grazing/fodder	Grass seed crop	Evidence of effect on seed germination required.
Italian ryegrass	Perennial ryegrass	Italian ryegrass tends to be more sensitive.
Hard fescue	Red fescue	Hard fescue tends to be more sensitive.
ARABLE		
Use pre-sowing, planting or emergence of a certain crop (contact herbicides only)	Use pre-sowing, planting or emergence of another crop (contact herbicides only)	
Sugar beet	Fodder beet	
Seed potatoes	Ware/industrial potatoes	Extrapolation is only possible for crop phytotoxicity. Extrapolation may not be possible for yield and quality parameters. Extrapolation the other way round is generally not acceptable due to high demands of seed potatoes and their shorter growing season.
Ware potatoes	Industrial potatoes	Extrapolation the other way round is generally not acceptable since growing season for ware potatoes is shorter
Winter barley	Winter wheat	
Spring barley	Spring wheat	
Forage maize	Grain maize	Extrapolation is also acceptable from grain maize to forage maize.
Linseed	Linola, Flax	If any concerns are noted with the test species then further evidence may be required

Combining peas	Field beans	For pre-emergence herbicides only, and if any concerns are noted with the test species then further evidence may be required
Field beans	Combining peas	For post-emergence herbicides only and if any concerns are noted with the test species then further evidence may be required
Oilseed rape	Mustard	If any concerns are noted with the test species then further evidence may be required
FLOWER BULBS and BULB FLOWERS		
Tulip, narcissus, hyacinth (spring flowering crops) and lily, gladiolus (summer flowering crops)	Other flower bulb and bulb flower crops	Test crops are listed as Tulip, Lily (Asiatic or longiflorum type) and Gladiolus as these are the most susceptible for phytotoxicity. Compared to gladiolus, tulip and lily are more susceptible to phytotoxicity.
Protected open field culture of bulb flowers	Outside open field culture of bulb flower	
Outside open field culture of flower bulbs	Outside open field culture of bulb flower	
SEED CROPS		
Regular production	Seed production of the same crop	Extrapolation is only possible for crop damage such as stunting or necrosis. Safety to the seed itself (e.g., germination) must be assessed separately unless there is considerable practical experience that no adverse effect is likely.
OUTDOOR VEGETABLES		
Head cabbage includes: red cabbage, white cabbage, Savoy cabbage and pointed head cabbage.		
Pre-emergence, sowing or planting application of one crop (contact herbicide only)	Pre-emergence, sowing or planting application of another crop (contact herbicide only)	
Application in a specific crop under protected conditions (contact herbicide only)	Application in the same crop in the open field (contact herbicide only)	
Leaf celery	Celeriac, cardoon	
Sown crop	Planted crop	

Seed onion	Seed shallot (and vice versa)	
1 st year set and seed onion	2 nd year set	
Bulb onion	Shallot, garlic	
Witloof (Belgian endive)	Chicory	
Bunched carrots and winter carrots	Carrots	
Carrot or radish	Parsley, horseradish, salsify	
Turnip	Swede	Swede to turnip may be possible depending on available evidence and expert judgement.
Red and white cabbage	Other head cabbages	
Cauliflower	Broccoli and vice versa	
Cauliflower	Roskoff Cauliflower	
Calabrese	Broccoli and vice versa	
Kale	Collards	
Crop on a planting bed	The same crop on a production field	
Broad beans	Other <i>Vicia spp</i>	Broad beans tend to be the most sensitive
Dwarf snap bean	Other <i>Phaseolus spp</i>	Dwarf snap beans tend to be the most sensitive
Garden pea	Other <i>Pisum spp</i>	Garden peas tend to be the most sensitive

PROTECTED VEGETABLES

General comments	<i>Lactuca sativa</i> spp.: head lettuce, iceberg lettuce, oak-leaf lettuce, Lollo Rosso, Lollo bionda, curled lettuce, leaf lettuce and cos lettuce.	
Application in a specific crop under protected conditions (only contact herbicide)	Application in the same crop outside (only contact herbicide)	
Pre-emergence, sowing or planting application of one crop (contact herbicide only)	Pre-emergence, sowing or planting application of another crop (contact herbicide only)	
Crop on a planting bed	The same crop on a production field	
Sown crop	Planted crop	
Lettuce	Iceberg lettuce	Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity. Iceberg lettuce has firmer, hardener leaves and is less susceptible to phytotoxicity.