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GUIDELINES FOR EFFICACY AND CROP SAFETY DATA EXTRAPOLATION FOR PEST CONTROL PRODUCTS IN KENYA



PEST CONTROL PRODUCTS

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GUIDELINES FOR EFFICACY AND CROP SAFETY DATA EXTRAPOLATION FOR PEST CONTROL PRODUCTS IN KENYA

1.0 Scope

These guidelines describe the principles of extrapolation regarding the efficacy and crop safety of pest control products. The document provides guidance for regulatory authority (Pest Control Products Board, hereafter referred to as the Authority) and applicants in the context of the registration of plant protection products. Acceptable extrapolations are described. These will be updated from time to time.

2.0 Introduction

Extensive data packages are required for registration of pest control products, in order to allow reliable risk assessment and justify their use. The current practice requires that applicants submit efficacy data for each target pest on each specific crop. Lack of requisite data may lead to lack of authorization of products for the market, especially those addressing minor uses (i.e. pests of comparatively low importance on a major crop [*‘minor pests’*], or pests of significant importance on crops of relatively low economic importance to the country [*‘minor crops’*]).

Data extrapolation allows for the existing authorization to be extended to include additional crops or pests without requiring generation of new/specific data. This reduces the cost of product registration and the time required in the process. An additional benefit is also to facilitate the approval of pest control products for minor uses.

The aim of the document is to provide guidance on principles of extrapolation regarding the efficacy and crop safety of pest control products. Extrapolation tables are provided for reference by applicants, accredited institutions and the regulatory authority. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of biology of the target pest either in extrapolating to other target species or for the same target pest in another crop. For crops, factors such as comparable growth habit, structure among others. should also be considered.

The guidelines make reference to the EPPO (European and Mediterranean Plant Protection Organization) standard on Efficacy and crop safety extrapolations for minor uses (PP 1/257 (2)).

3.0 Rationale

Data extrapolation takes into consideration that certain similarities do exist in crop and pest combination in the sense that: (a) the same organism could infest/infect different hosts, (b) closely related pests could be managed using the same pest control products, (c) closely related crops may be managed the same way with respect to good agriculture practices (GAP) and could respond in a similar way to application of pest control products. Hence, experience (data) obtained in one scenario

could be used to consider authorization in another closely related scenario without having to generate a whole set of new data.

4.0 Principles

Extrapolations may be considered:

- within the same crop, but across different pests/indications;
- across different crops within the same crop group for similar or different pests;
- taking due consideration of local conditions (e.g. economic importance of a crop(s) or pest(s)), agronomic practices, pest resistance management strategies, among others.

It is important to ensure that expert judgment and regulatory experience are employed when using extrapolation tables. The principles for extrapolation discussed below segregate herbicides from other pest control products (fungicides, insecticides, bactericides, acaricides, molluscicides, avicides and nematocides) and plant growth regulators. Herbicides may cause phytotoxic effects on plants of the same or different grouping as such, crop safety data is very critical.

4.1 Key factors relevant for extrapolation of fungicides, insecticides, bactericides, acaricides, molluscicides, avicides and nematocides.

4.1.1 Crop

Crop morphology, taxonomic relationship (botanical family), cropping system, growth pattern and growth stage are key considerations in extrapolation. It should be noted that considerable differences could still occur between closely related species in terms of growth pattern, leaf surface, canopy size or the parts of plant that are harvested or consumed.

- Control of the target organism in the extrapolated crops is done in the same way as in the crop for which the pest control product was reviewed (indicator crop): timing of application, method, and frequency of application among others.
- The properties of the crops should be taken into account (woody, perennial, annual, growth habit, type of produce among others.) Comparative damage in the reviewed crop - pest, disease and/or weed combination and the extrapolated crop should not differ.
- The most sensitive crop should be reviewed if any difference in sensitivity between crops is known to exist.

4.1.2 Disease/Pest

Taxonomic relationship, pest biology and life cycle, behaviour of the pest, plant parts attacked and nature of damage caused are key considerations in extrapolation. Closely-related species may have significant differences. A given pest species may behave differently between crops. For example, different generations of a pest may cause different types of damage, so care is needed with extrapolation between crops; or similarities in feeding behaviour of insects may make extrapolation

across a range of pest groups appropriate, but the biology of the individual pest is still important. If different stages of the target organism can cause damage, there should be no difference between the reviewed crop and the extrapolated crop in respect to sensitivity to the different stages of the target organism.

For new/emerging pests in Kenya, specific efficacy data may be required.

4.1.3 Product

Formulation, mode of action, specified GAP (good agricultural practices) - including dosage, timing, frequency and method of application; preventative or curative treatment; systemic or non-systemic, quality and amount of existing data are key considerations in extrapolation.

- All proposed extrapolations should concern the same pest control products used in the same formulation and in the same dose. Applicants should provide the scientific rationale for adjustment of the amount of product applied (spray volume) per unit area, where canopy size of plant spacing may be different, and thereby leading to a variation in application volume.
- In case the mode of action of the pest control product is very particular to one target organism only, it will not be possible to extrapolate to other target organisms, even though they are mentioned in the tables.

4.1.4 Agronomic practices

Growing conditions (outdoor or protected) and cultivation techniques, growing systems, soil type (particularly for soil treatments) are key considerations in extrapolation. Generally, foliar applications in protected situations are easier to manage than in outdoor situations.

- Account should be taken of soil type, whenever it is known that soil type has an effect on efficacy. If this is known, it is only possible to extrapolate from crops grown on similar soils. This is for instance relevant for soil treatments, such as granular formulations, and wet soil sterilisation products.
- Both cropping systems and husbandry practices of individual crops should be taken into account (e.g. open field crops, protected crops, use of irrigation).

4.1.5 Seed treatment

Extrapolation between seed treatments of different crops is normally more acceptable when there are similarities in seeding density, thousand grain weight and seed size. Difference in size of seeds between different crops may lead to different dilution effects as the crop continues to grow, which may mean that extrapolation is not possible. Extrapolation may also not be possible where the growth rate of different crops varies significantly due to differences in dilution effects, especially for systemic plant protection products.

Other factors to be considered for seed treatment are: sowing period, time of appearance of pest, application technique and nature of skin (rough or smooth surface of the seed).

4.2 Key factors relevant for extrapolation of herbicides

Specific principles which may be relevant for extrapolation between crops for the same target weeds:

- When considering the acceptability of an extrapolation, account should be taken of timing of weed control, time/ method of sowing/planting, competitiveness of the crop, time/method of harvesting and ease of separating crop and weed seeds;
- When effectiveness of a herbicide has been adequately demonstrated against a major weed species or a range of species from a particular plant family, it may be possible to extrapolate within the same genus.
- Extrapolation may be possible from the control of a particular weed outdoors to the same species under protected conditions, since conditions are less variable and weeds under protection tend to be more sensitive. However, effectiveness under protected conditions cannot be extrapolated to outdoor use as weeds growing outdoors are usually hardened off and therefore less sensitive to herbicides;
- The efficacy of soil-acting herbicides against weed species in the field cannot be extrapolated to use in container plants or plants in artificial substrate. This is due to the likelihood of different effects of different growing media on efficacy.

Extrapolation from one weed family to other weed family is generally not possible, because of differences in the sensitivity of weed species to a herbicide. However, when trials are carried out with several weed species from the same group of weeds (e.g. annual dicotyledonous or annual grasses), extrapolation is possible to the whole group. This does not mean that all weeds in this group are susceptible. The susceptible weeds may be mentioned on the label.

4.2.1 Crop

Crop morphology, competitiveness of the crop, growth habit and growth pattern are key considerations in extrapolation. It should be noted that closely-related species may still differ significantly in growth habit. Time/method of sowing/planting, cropping system, time/method of harvesting and ease of separating crop and weed seeds should also be considered. In some situations such as plantation crops of different families, extrapolation may be possible where the contact between the herbicide may be minimal e.g a herbicide for use on coffee can be extrapolated to mangoes. However, crop safety data should be provided.

4.2.2 Weed

Taxonomic relationship, biology, life cycle, behaviour and growth stage are key considerations in extrapolation. Closely-related species may have significant differences.

4.2.3 Product

Mode of action, time of application, frequency, method of application, aerial or soil treatment,

formulation, dose, spray volume, extent of existing database, regional differences in susceptibility of weeds to plant protection products which might exist are key considerations in extrapolation.

4.2.4 Agronomic Practices

Growing conditions and cultivation techniques, growing systems, field or protected and soil type (particularly for soil treatments) should be considered.

4.3 Crop safety

Phytotoxicity is particularly relevant with certain products, such as herbicides, some types of application, such as soil or seed/plant treatments, and for specific crops such as ornamentals. Phytotoxicity can vary considerably between different crop species, cultivars of the same crop and between different plant protection products. Extrapolation is possible in some situations but should be well reasoned in order to ensure crop safety. It may be based on comparison between the minor crop and crops on which the product is already approved. If an extensive database on crop safety for the plant protection product is available, crop groups may be developed. On the other hand, extrapolation may not be possible where use of the product has resulted in crop damage on some crops or cultivars, where crops concerned are significantly different, or when a crop is known to be particularly sensitive. In addition to or to assist extrapolation, it may be possible to assess crop safety while obtaining data for residues or effectiveness for a particular plant protection product.

The general principles for extrapolation in this guideline apply also in cases of extrapolation for crop safety. In addition, the following specific principles are important:

- The method of application for the crops involved in the extrapolation should be similar;
- Availability and interpretation of evidence of crop safety (or of phytotoxicity) from standard pre- and post-emergence pot tests and greenhouse varietal screens should be treated with care. Conditions in a greenhouse can affect the structure of plant surfaces, as well as pest biology, thereby changing the crop safety of a product.
- Taxonomic relation to the crop for which the product is already approved;
- Similarity in morphology of the crops concerned;
- Availability of adequate crop safety data showing a good margin of safety for the crop(s) from which extrapolation is required and across a range of cultivars.

4.3.1 Crop safety extrapolations for fungicides, insecticides, bactericides, acaricides, molluscicides, avicides and nematicides

As a general principle, insecticides and fungicides would be expected to have low phytotoxic activity with limited adverse effects on the treated crop. The extent of extrapolation within or between crops is largely dependent on the use of the product, known sensitivity of the treated crop and/or growth stage, and the extent of existing knowledge. Evidence may be available from standard pre- and post-emergence pot tests and greenhouse varietal screens. Such preliminary data provides a very useful baseline of inherent crop safety properties for a particular active substance. Following this, trials using the relevant formulation will provide assessments of phytotoxicity in both efficacy trials on the main target crops, and possibly data from specific crop safety trials.

Where relevant for major crops, these should also include some evidence on yield effects. Using this combination of greenhouse and field data, information can be built up on a range of uses and also perhaps formulation types. As existing knowledge builds up, the scope for extrapolation to other crops in the absence of further crop safety data becomes greater. Where there are significant differences between the current use and a proposed extrapolation, particularly regarding dose and formulation, additional data may be required. However, even in these circumstances there may be evidence of inherent crop safety at high doses, or across a range of formulation types, which could be used as evidence in making a reasoned case.

Other factors such as timing, application method, growing conditions and crop morphology will also need to be addressed, either by a reasoned case or further limited data. For insecticides and fungicides with a robust database indicating inherent crop safety across a range of conditions and crops, additional data may only be required in very specific circumstances, e.g. for a new crop of known particular sensitivity.

Given the above, the suitability of extrapolation from a crop safety perspective will need to be considered on a case-by-case basis for a particular product, making full use of existing knowledge. Nevertheless some general comments on crop safety for particular crop groups are provided in ‘Extrapolation tables for crop safety of fungicides and insecticides’ as well as, where known, information on the more sensitive crops and/or crop stages. These are particularly appropriate as test plants because they represent a ‘worst case’ and provide greater scope for extrapolation. They could be used as indicator plants in crop groups for crop safety extrapolations to be developed in the future, as experience in crop safety extrapolations develops.

4.3.2 Crop safety extrapolations for herbicides

Crop safety is particularly an issue in the case of herbicides. Specific principles are not available and extrapolations have to be considered on a case-by-case basis. If a herbicide is demonstrated as only effective against monocotyledonous species, it may be possible to extrapolate crop safety between dicotyledonous crops, and vice versa. However, this will depend on the information available on the

active substance.

5.0 Extrapolation Tables

The following tables are attached to this guideline:

- Extrapolation tables for efficacy of fungicides;
- Extrapolation tables for efficacy of insecticides;
- Extrapolation tables for crop safety of fungicides and insecticides
- Extrapolation tables for efficacy of herbicides;
- Extrapolation tables for crop safety of herbicides;
- Extrapolation tables for nematicides

A. VEGETABLES

Extrapolation Tables For Efficacy Of Pest Control Products

Introduction

The table provides detailed lists of acceptable extrapolations organized by crop groups, for the regulatory authority and applicants, in the context of the registration of pest control products. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. The tables should be used in conjunction with the above guidelines.

The scope for extrapolation may be extended as data and experience with a certain plant protection products increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of biology of the target pest may be a relevant factor, either in extrapolating to other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure among others should be considered.

Table format

The main pest species for the crop group are listed in Column 1 (although this is not exhaustive), and the pest group to which they belong is specified in Column 2. Companies may choose if they wish to provide data only for individual named species, which would then appear individually listed on the label. But underlined species have been identified as key major targets and as such it is advisable to generate data on these. Furthermore, data on these species then allow a claim to be made for the whole pest group (as specified in Column 2), if required. If a claim for the whole pest group is required but there is no underlined species, then data must be generated on all listed species.

Column 3 indicates the key indicator crop(s) for the crop group. In some instances this may be only one specified crop. In other cases, when separated by an 'or', the company may choose from a range of alternatives within the group. Data generated on crops in Column 3 may be used to extrapolate to all crops listed in Column 4. However, it is preferable to have data on several of the crops within the crop group, but data on the indicator crop should be available.

Column 5 identifies whether data on other crops against the same target may help to reduce the amount of required data on the indicator crop. It may be possible for a direct extrapolation without the need for further data on the indicator crop (marked with an asterisk (*)). However, this is dependent on the extent of available data and similarity of crop/target biology.

The company should provide an appropriate reasoned case when wanting to use supporting data from other crop groups.

Column 6 gives examples of acceptable extrapolations for a particular pest claim onto other crops. This is not a comprehensive list. Whether extrapolation may be direct (no data, marked with an asterisk (*)), or require additional supporting data on the other crop, will again be dependent on the extent and relevance of the existing database and companies should provide an appropriate reasoned case.

Extrapolation regarding protected/outdoor situations

Please note that where crops may be grown in both protected and field situations, and where significant differences are expected in pest relevance or crop agronomy between indoor and outdoor situations, it is important to generate a proportion of the data on crops grown in both situations to ensure the product has been tested under a suitable range of typical and challenging conditions.

a. Extrapolation tables for efficacy fungicides

Table1. DISEASES ON LEGUME VEGETABLES

Vicia faba VICFX, *Phaseolus* sp. PHSSS, *Pisum sativum* PIBSX, *Lens culinaris* LENCU, *Cicer arietinum* CIEAR, *Arachis hypogea* ARHHY

Pests		Crop: within Legume vegetables		Crops: outside Legume vegetables, including pulses	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Phytophthora pisi</i> PHYTPI	Root rot	Pea PIBSX or Broad bean VICFX	Pea PIBSX, Broad bean VICFX	<i>Vicia faba</i> subsp <i>minor</i> * VICFM (field beans)	<i>Vicia</i> sp. VICSS, <i>Pisum</i> sp. PIBSS
<i>Fusarium</i> sp. FUSASP (e.g. <i>Fusarium solani</i> , <i>Fusarium oxysporum</i>)	Root rot	<i>Phaseolus vulgaris</i> PHSVX or Pea PIBSX or Broad bean VICFX or Lentils LENCU or Chickpea CIEAR	All legume vegetables	Fabaceae 1LEGF	Fabaceae 1LEGF
<i>Thanatephorus cucumeris</i> (= <i>Rhizoctonia solani</i>) RHIZSO	Root rot	<i>Phaseolus vulgaris</i> PHSVX or Pea PIBSX or Broad bean VICFX or Lentils LENCU or Chickpea CIEAR	All legume vegetables	Potato SOLTU (AG3, AG2-1), Lettuce LACSA (AG4), Cucurbitaceae 1CUCF (in soil) (AG4 (AG5)), Vegetable brassica (AG2-1, AG4), Beets BEAVD (AG2-2, AG4, AG1, AG3, AG5), Fabaceae 1LEGF (AG4, AG2-2)*, Strawberry FRASS (AG2-1), Tomato LYPES (AG3,	All crops where root rot caused by the same AGgroups appear

Pests		Crop: within Legume vegetables		Crops: outside Legume vegetables, including pulses	
				AG4) AG (Anastomosis groups)	
<i>Pythium</i> sp. PYTHSP	Root rot	<i>Phaseolus vulgaris</i> PHSVX or Pea PIBSX or Broad bean VICFX or Lentils LENCU or Chickpea CIEAR	All legume vegetables	Fabaceae 1LEGF	Fabaceae 1LEGF
<i>Phytophthora</i> sp. PHYTSP	Root rot	<i>Phaseolus vulgaris</i> PHSVX or Pea PIBSX or Broad bean VICFX or Chickpea CIEAR	All legume vegetables	Fabaceae 1LEGF	Fabaceae 1LEGF
<i>Didymella</i> sp. DIDYSP, <i>D. fabae</i> ASCOFA, <i>D. pisi</i> ASCOPI, <i>D. rabiei</i> MYCORA, <i>Ascochyta phaseolorum</i> PHOMEX, <i>Peyronellaea arachidicola</i> PHOMAR	Leaf and pod spot	<i>Phaseolus vulgaris</i> PHSVX or Pea PIBSX or Chickpea CIEAR or Broad bean VICFX,	Pea PIBSX, Broad bean VICFX, <i>Phaseolus vulgaris</i> PHSVX, Lentils LENCU, Chickpea CIEAR, Peanut ARHHY	<i>Pisum</i> sp. PIBSS, <i>Vicia</i> sp. VICSS	<i>Pisum</i> sp. PIBSS, <i>Vicia</i> sp. VICSS
<i>Didymella pisi</i> ASCOPI (= <i>Ascochyta pisi</i>) or <i>Peyronellaea pinodes</i> MYCOPI (= <i>Mycosphaerella pinodes</i> , <i>Ascochyta pinodes</i>) or	Ascochyta blight	Pea PIBSX	<i>Phaseolus vulgaris</i> Broad bean VICFX PHSVX, Lentils LENC, Chickpea CIEAR	Fabaceae 1LEGF	All relevant Fabaceae 1LEGF*

Pests		Crop: within Legume vegetables		Crops: outside Legume vegetables, including pulses	
<i>Peyronellaea pinodella</i> PHOMMP (= <i>Phoma medicaginis</i> var. <i>pinodella</i> , <i>Ascochyta pinodella</i>)					
<i>Cercospora</i> sp. CERCSP	Leaf spot	<i>Phaseolus vulgaris</i> PHSVX or Broad bean VICFX or Lentils LENCU	Broad bean VICFX, Lentils LENCU, Chickpea CIEAR, Peanut ARHHY	<i>Vicia</i> sp. VICSS*, <i>Lathyrus</i> sp. LTHSS	<i>Vicia</i> sp. VICSS*, <i>Lathyrus</i> sp. LTHSS
<i>Phaeoisariopsis griseola</i> PHAIGR	Angular Leaf spot	<i>Phaseolus vulgaris</i> PHSVX	<i>Phaseolus</i> 1PHSG	Fabaceae 1LEGF	<i>Vigna</i> sp. VIGSS
<i>Colletotrichum</i> sp. (E.g <i>C.lindemuthianum</i> COLLLD, <i>C. truncatum</i> COLLDU)	Anthracnose	<i>Phaseolus vulgaris</i> PHSVX	Pea PIBSX, Broad bean VICFX, <i>Phaseolus</i> sp. PHSSS, Lentil LENCU, Chickpea CIEAR, Peanut ARHHY	<i>Phaseolus</i> sp. PHSSS, <i>Vigna</i> sp. VIGSS, <i>Glycine</i> 1GLXG	<i>Phaseolus</i> sp. PHSSS, <i>Vigna</i> sp. VIGSS, <i>Glycine</i> 1GLXG, <i>Vicia</i> sp. VICSS
<i>Uromyces</i> sp. UROMSP, <i>U. viciae-fabae</i> UROMVF, <i>U. appendiculatus</i> UROMAP <i>Uromyces ciceris-arietini</i> UROMCA	Rust	<i>Phaseolus</i> sp. PHSSS or Broad bean VICFX or Lentils LENCU or Chickpea CIEAR	All legume vegetables	Fabaceae 1LEGF*	Fabaceae 1LEGF
<i>Erysiphe</i> sp. ERYSSP, <i>E. pisi</i> ERYSPI, <i>E. betae</i> ERYSBE, <i>Blumeria graminis</i> f. sp. <i>avenae</i> ERYSGA	Powdery mildew	Pea PIBSX or <i>Phaseolus vulgaris</i> PHSVX or Broad Bean VICFX	Pea PIBSX, Broad Bean VICFX, <i>Phaseolus</i> sp. PHSSS Chickpea CIEAR, Lentils LENCU	Fabaceae 1LEGF*, Beta 1BEAG	Fabaceae 1LEGF

Pests		Crop: within Legume vegetables		Crops: outside Legume vegetables, including pulses	
<i>Peronospora viciae</i> PEROVI	Downy mildew	Pea PIBSX or <i>Phaseolus vulgaris</i> PHSVX or Broad bean VICFX or Lentils LENCU	Pea PIBSX, Broad Bean VICFX, <i>Phaseolus vulgaris</i>	, <i>Vicia</i> sp. VICSS, <i>Medicago</i> 1MEDG, <i>Trifolium</i> 1TRFG	<i>Pisum</i> sp. PIBSS, <i>Vicia</i> sp. VICSS, <i>Medicago</i> 1MEDG, <i>Trifolium</i> 1TRFG
<i>Phytophthora</i> sp., <i>Phytophthora phaseoli</i> PHYTPH, <i>Phytophthora nicotianae</i> var. <i>parasitica</i> PHYTNP	Downy mildew	Pea PIBSX or <i>Phaseolus vulgaris</i> PHSVX or Broad bean VICFX or Lentils LENCU	<i>Phaseolus vulgaris</i> PHSVX, Lentil LENCU	Any other relevant crop	Any other relevant crop
<i>Botryotinia fuckeliana</i> BOTRCI	Grey mold	<i>Phaseolus vulgaris</i> PHSVX	All legume vegetables	Strawberry FRASS, Grapes VITVI, any other relevant crop	All relevant crops where this disease appear ¹
<i>Fusarium oxysporum</i> FUSAOX	Wilt	<i>Phaseolus vulgaris</i> PHSVX or Pea PIBSX or Broad Bean VICFX	All legume vegetables	<i>Pisum</i> sp. PIBSS, <i>Phaseolus</i> sp. PHSSS	<i>Pisum</i> sp. PIBSS, <i>Phaseolus</i> sp. PHSSS
<i>Sclerotinia</i> sp. (<i>S. sclerotiorum</i> SCLESC, <i>S. minor</i> SCLEMI, <i>S. trifoliorum</i> SCLETR)	White mould Watery soft rot	Pea PIBSX or <i>Phaseolus</i> sp. PHSSS or <i>Broad bean</i> VICFX or Pea nut ARHHY or Lentils LENCU or Chickpea CIEAR	Pea PIBSX, <i>Phaseolus</i> sp. PHSSS, or Broad bean VICFX, Peanut ARHHY or Lentils LENCU, Chickpea CIEAR,	Lettuce LACSA, Oilseed rape BRSNN, Sunflower HELAN, Carrots DAUCA or any other relevant crop	All relevant crops where these diseases appear ¹
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests					

Pests		Crop: within Legume vegetables		Crops: outside Legume vegetables, including pulses	
<i>Pythium</i> sp. PYTHSP, Oomycetes 1OOMYC	Damping off	<i>Phaseolus</i> sp. PHSSS or Pea PIBSX	All legume vegetables	Lettuce LACSA or Vegetable brassica or Cucumber CUMSA or Melon CUMME or Spinach SPQOL or Beet BEASS or Tomato LYPES	All crops where damping off caused by Oomycetes appear
<i>Aphanomyces</i> sp. APHASP	Damping off	<i>Phaseolus</i> sp. PHSSS or Pea PIBSX	All legume vegetables	Pea PIBSX	Other leguminous crops Other beet crops (Beta sp. BEASS), Chenopodioideae 1CHES
<i>Fusarium</i> FUSASP Tomato LYPES or	Damping off	<i>Phaseolus</i> sp. PHSSS or Pea PIBSX	All legume vegetables	Tomato LYPES or Cucurbitaceae 1CUCF (both grown in the soil) or any other relevant crop	All crops where Fusarium damping off appear
<i>Thanatephorus cucumberis</i> RHIZSO	Damping off	<i>Phaseolus</i> sp. PHSSS or Pea PIBSX	All legume vegetables	Potato SOLTU (AG3, AG2- 1), Lettuce LACSA (AG4), Cucurbitaceae 1CUCF (in soil) (AG4 (AG5)), Vegetable brassica (AG2-1, AG4) Beets BEAVD (AG2- 2, AG4, AG1, AG3, AG5) Fabaceae 1LEGF (AG4, AG2-2) Strawberry FRASS (AG2-1), Tomato LYPES (AG3, AG4)	All crops where damping off caused by the same AG-groups appear
<i>Sclerotinia</i> sp. SCLESP or <i>Sclerotium rolfsii</i> SCLORO	Damping off	<i>Phaseolus</i> sp. PHSSS or Pea PIBSX	All legume vegetables	Lettuce LACSA or Tomato LYPES or Pepper CPSAN or <i>Phaseolus</i> sp. PHSSS	All crops where Sclerotina damping off appear
<i>Botryotinia fuckeliana</i> BOTRCI	Damping off	<i>Phaseolus</i> sp. PHSSS or Pea PIBSX	All legume vegetables	Fabaceae 1LEGF or Lettuce LACSA or Tomato LYPES	All crops where damping off appear. Not covering post-harvest effects.

Pests		Crop: within Legume vegetables		Crops: outside Legume vegetables, including pulses	
<i>Pseudomonas syringae</i> (incl. <i>Pseudomonas syringae</i> pv. <i>pisi</i> PSDMPI, <i>Pseudomonas savastanoi</i> pv. <i>phaseolicola</i> PSDMPH)	Bacterial blight	<i>Phaseolus vulgaris</i> PHSVX or Pea PIBSX	<i>Phaseolus</i> sp. PHSSS, Pea PIBSX		
<i>Xanthomonas axonopodis</i> pv. <i>phaseoli</i> XANTPH	Bacterial blight	<i>Phaseolus vulgaris</i> PHSVX	<i>Phaseolus</i> sp. PHSSS, Pea PIBSX		

Table 2: DISEASES ON FRUITING VEGETABLES OF SOLANACEAE

LYPES Tomato *Solanum lycopersicum*, SOLME Aubergine *Solanum melongena*, CPSAN Sweet Pepper *Capsicum annuum*, CPSFR Chilli pepper *Capsicum frutescens*, PHYSS *Physalis* sp., SOLMU Pepino *Solanum muricatum*

Pests		Crops: within Fruiting Vegetables of Solanaceae		Crops: outside the Fruiting Vegetables of Solanaceae	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Mycovellosiella fulva</i> (= <i>Fluvia fulva</i> , <i>Cladosporium fulvum</i>) FULVFU	Leaf mould of tomato	Tomato LYPES			All cucurbit crops 1CUCF, Spinach SPQOL
<i>Leveillula taurica</i> LEVETA	Powdery mildew	Tomato LYPES Or Sweet pepper CPSAN	Aubergine SOLME, Sweet pepper CPSAN, Chilli pepper CPSFR		Seed crops, Chicory CICIN
<i>Oidium neolycopersici</i> OIDINL	Powdery mildew	Tomato LYPES	Aubergine SOLME		Tobacco NIOSS; Lambs Lettuce VLLLO
<i>Alternaria</i> spp. ALTESP (A. <i>alternata</i> , A. <i>solani</i> etc.)	Early blight (leaf and stem blight and fruit rot)	Tomato LYPES	Aubergine SOLME, Sweet pepper CPSAN	Potato SOLTU, Strawberry FRASS, Beta beet BEAVX, Cucumber CUMSC, Garden Carrot DAUCS, Garden bean PHSVX, Fennel FOESS, Head cabbage BRSOX, Leek ALLPO, Oilseed rape BRSNN, Onions ALLSS,	Endive CICEN, Wild lettuce LACSE, Lamb's lettuce VLLLO, Black salsify SCVHI, Herbs, Turnip BRSRR, Garden parsley PARCR, Onions ALLSS, Cucumber CUMSC, Artichoke CUYSC, Witloof chicory CICIF, Tobacco NIOSS, potato

				Beans PHSSS, Spinach	SOLTU
<i>Phytophthora infestans</i> PHYTIN	Late blight	Tomato LYPES	Aubergine SOLME	Potato SOLTU	Herbs, potato SOLTU
<i>Pyrenochaeta lycopersici</i> PYRELY	Corky root	Tomato LYPES or Aubergine SOLME, or Sweet pepper CPSAN, or chilli pepper CPSFR	Aubergine SOLME, Sweet pepper CPSAN, Chilli pepper CPSFR	All cucurbit crops 1CUCF	Herbs, All cucurbit crops 1CUCF, Spinach SPQOL, Potato SOLTU
<i>Colletotrichum coccodes</i> COLLCC	Black root rot Black dot	Tomato LYPES or Aubergine SOLME, or sweet pepper CPSAN, or chilli pepper CPSFR	Aubergine SOLME, Sweet pepper CPSAN, Chilli pepper CPSFR		Herbs, All cucurbit crops 1CUCF, Spinach SPQOL, Potato SOLTU
<i>Didymella lycopersici</i> DIDYLY	Didymella Stem rot	Tomato LYPES		All cucurbit crops 1CUCF	All cucurbit crops 1CUCF, Herbs
<i>Rhizoctonia</i> spp. RHIZSP	<i>Rhizoctonia</i> rot	Tomato LYPES	Aubergine SOLME, Sweet pepper CPSAN, Chilli pepper CPSFR	Strawberry FRASS, Artichoke CYUSC, Cabbage BRSOX, Lettuce LACSS, All Cucurbit Crops 1CUCF, Beta Beet BEAVX, Potato SOLTU, Garden Bean PHSVX, Leek ALLPO, Radish RAPSRS, Beans PHSSS	Herbs, Radish RAPSRS, Endive CICEN, Begonia 1BEGG, Cauliflower BRSOB, Chrysanthemum 1CHYG, African violet SNPSS, Witloof chicory CICIF, Potatoes SOLTU

The following extrapolation possibilities are proposed to be addressed in tables covering generic pests

<i>Botrytis cinerea</i> BOTRCI, <i>Sclerotinia</i> sp. SCLESP	Grey mould, white mould	Tomato LYPES	Aubergine SOLME, Sweet pepper CPSAN, Chilli pepper CPSFR	Strawberry FRASS, All Cucurbit Crops 1CUCF, Rose ROSSS, Cabbage BRSOX, Artichoke CYUSC, Lettuce LACSS, Pea PIBSS, Potato SOLTU, Leek ALLPO, Garden Bean PHSVX, Grapes VITVI, Beans PHSSS,	Faba Bean VICFX, Herbs, Chrysanthemum CHYIN, Christmas Flower EPHPU, Pelargonium PELSS, Sim's Azalea RHOSI, Begonia BEGGS, Hydrangea HYESSE, Cyclamen CYZSS, Primrose PRISS, African Violet SNPSS, All Cucurbit Crops 1CUCF, Lettuce LACSS, Tobacco NIOSS
<i>Phytophthora nicotianae</i> PHYTNN, <i>P. capsici</i> PHYTCP, <i>P. cactorum</i> PHYTCC etc.	Blight of sweet pepper	Sweet pepper CPSAN	Aubergine SOLME, tomato LYPES, Chilli pepper CPSFR	All cucurbit crops 1CUCF, Pineapple	Herbs; Potted ornamentals & cut flowers
<i>Pythium</i> spp. (<i>P. ultimum</i> PYTHUL, <i>P. aphanidermatum</i> PYTHAP)	Pythium wilt	Tomato LYPES	Aubergine SOLME, Sweet pepper CPSAN, Chilli pepper CPSFR	All cucurbit crops 1CUCF, kidney bean PHSVX, beta beet BEAVX, leek ALLPO cabbage BRSOX, lettuce LACSS, Beans PHSSS	Herbs, gloxinia GOXSS, christmas flower (poinsetia) EPHPU, Potted ornamentals & cut flowers, Lettuce LACSS, Spinach SPQOL
<i>Fusarium</i> spp. (<i>Fusarium solani</i> FUSASO, <i>Fusarium oxysporum</i>)	Fusarium	tomato LYPES	Aubergine SOLME, Sweet pepper CPSAN	All cucurbit crops 1CUCF	Herbs, All cucurbit crops 1CUCF
<i>Verticillium</i> spp. VERTSP	Verticillium wilt	Tomato LYPES, or Aubergine SOLME, or capsicum CPSSS	Chilli pepper CPSFR, Sweet pepper CPSAN,	Potato SOLTU, all cucurbit crops 1CUCF, strawberry FRASS, artichoke CYUSC, rose ROSSS, bean PHSVX, peas PIBSS, Beans PHSSS	Herbs, chrysanthemum 1CHYG, geranium 1GERG, forsythia FOSSS, brussels sprouts BRISO, Potted ornamentals & cut flowers, cucurbits 1CUCF, tobacco NIOTA, pea PIBSS

<i>Acidovorax</i> <i>valerianella</i> ACVRVA, <i>Pseudomonas</i> sp., ERWICA, <i>Xanthomonas</i> sp. XANTSP <i>Clavibacter</i> <i>michiganensis</i>	Bacterium disease	Tomato LYPES			Lettuce LACSS
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Abbreviations in capital letters following the common names of the crops are short forms of botanical names e.g. LYPES for Tomato *Solanum lycopersicum*

Table 3: DISEASES ON LEAFY VEGETABLES:

Asteraceae : LACSA lettuce *Lactuca sativa*, LACSE prickly lettuce *Lactuca serriola*, CICEN endive *Cichorium endivia*, CICIN chicory *Cichorium intybus*, CICIF chicory witloof *Cichorium intybus* var. *foliosum*, TAROF dandelion *Taraxacum officinale*.

Crucifereae : LEPSA garden cress *Lepidium sativum*, BARVE landcress *Barbarea verna*, DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *Sativa*, NAAOF watercress *Nasturtium officinale*, BRSJU leaf mustard *Brassica juncea*, Kales *Brassica oleracea*

Chenopodioideae : SPQOL spinach *Spinacia oleracea*, BEAVV chard (Kenyan spinach) *Beta vulgaris* subsp. *vulgaris*.

Other: VLLLO lamb's lettuce *Valerianella locusta*, SANMI burnet *Sanguisorba minor*, VERBE cow cress *Veronica beccabunga*, VLLER Italian corn salad *Valerianella eriocarpa*, POROS purslane *Portulaca oleracea* subsp. *sativa*.

Pests		Crops: within the leafy vegetables		Crops: outside the leafy vegetables	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Bremia</i> sp. BREMS	Downy Mildew	Lettuce LACSS	Leafy vegetables of the Asteraceae 1COMF, Prickly lettuce LACSE, Dandelion TAROF, Endive CICEN, chicory CICIN		Artichoke CYUSC, Fresh herbs,
<i>Peronospora</i> sp.		Spinach BEAVV or kales	Crucifereae 1CRUF, Chenopodioideae 1CHES (SpinachBEAVV, Chard BEAVV), Rocket ERUVE, Lamb's lettuce VLLLO, Italian corn salad VLLER	All brassicaceae, onion	All brassicaceae, Red beet BEAVD

<u>Septoria</u> sp. SEPTSP, <i>Cercospora</i> sp. 1CERCG, <i>Ramularia</i> sp. RAMUSP	Leaf spot disease	Lettuce LACSS, Spinach BEAVV	Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES	Parsley PARCR, Carrot DAUCA	Celery APUGV, Celeriac APUGR, Parsnip PAVSA, Artichoke CUYSC
<i>Alternaria</i> sp. ALTESP		Lambs Lettuce VLLLO or kales	Italian corn salad VLLER, witloof CICIF, Endive CICEN, Wild lettuce LACSE,	Tomato LYPES, Potato, Brassicaceae, Carrot, Cucurbitaceae 1CUCF	Parsley PARCR
<i>Microdochium panattonianum</i> sp. MARSPA,		Lettuce LACSS	Leaf spot disease in Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES Italian corn salad VLLER, Witloof CICIF, Endive CICEN, Wild lettuce LACSE,		Parsley PARCR
<u>Cladosporium</u> sp. CLADSP, <i>Colletotrichum</i> sp. 1COLLG		Spinach BEAVV,	Lettuce LACSS	Tomato LYPES, Cucurbitaceae 1CUCF	Ornamentals
<u>Phoma</u> sp. PHOMSP	Black leg	Kales	Cruciferae, Brasiccae	Cabbage BRSOL, potatoes SOLTU	

<i>Erysiphe</i> ERYSSP	sp.	Powdery mildew	Lambs Lettuce VLLLO, Chicory CICIN or Kales or Spinach	Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES (particularly Prickly lettuce LACSE, Dandelion TAROF), Lamb's lettuce VLLLO, Italian corn salad VLLER, Endive CICEN	Cucurbitaceae 1CUCF, Tomato LYPES, Peas	Fresh herbs, peas
<i>Puccinia</i> PUCCSP	sp.	Rust	Lettuce LACSS or Chicory CICIN	Leafy vegetables of the Asteraceae (particularly Prickly lettuce LACSE, dandelion TAROF)	Asparagus ASPOF, Liliaceae 1LILF, Cereals*,	Onions
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests						
<i>Botrytis</i> BOTRSP, <i>Sclerotinia</i> 1SCLEG	sp. sp.	Moulds	Kales or Spinach or Lettuce LACSS	Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES, (particularly prickly lettuce LACSE, , chicory CICIN, endive CICEN, witloof CICIF, rocket ERUVE), Italian corn salad VLLER, , lamb's lettuce VLLLO, cowpea leaves	Cucurbitaceae 1CUCF, Tomato LYPES, Brassicaceae 1CRUF, leguminous vegetables	Tobacco NIOSS, fresh herbs, ornamentals ¹ , Tomato LYPES, Cabbage BRSOX, Brussels sprouts BRSOX, Flower head brassicas, Leafy brassicas

<i>Rhizoctonia</i> sp. RHIZSP	Rhizoctonia root rot	Lettuce LACSS	Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES (particularly prickly lettuce LACSE, dandelion TAROF, spinach SPQOL, witloof CICIF, chard BEAVV), lamb's lettuce VLLLO, Italian corn salad VLLER, Endive CICHEN	Potato SOLTU, Brassicaceae 1CRUF, Tomato LYPES	Tomato LYPES, leafy herbs
<i>Pythium</i> sp. PYTHSP <i>Phytophthora</i>	Pythium root rot	Lettuce LACSS or Spinach BEAVV or kales	Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES, (particularly endive CICHEN, chicory CICHEN, witloof CICIF, chard BEAVV), Italian corn salad VLLER,	Cucurbitaceae 1CUCF, Brassicaceae 1CRUF, Solanaceae 1SOLF, beets BEAVX	Tobacco NIOSS, ornamentals, fresh herbs, Tomato LYPES
<i>Thielaviopsis</i> sp. THIESP <i>Fusarium</i>	Root rots	Lettuce LACSS	Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES	Carrot DAUCA, Leguminosae 1LEGF	
<i>Acidovorax valerianella</i> ACVRVA, <i>Pseudomonas</i> sp., ERWICA, <i>Xanthomonas</i> sp. XANTSP	Bacterium disease	Kales	Leafy vegetables of the Asteraceae 1COMF, Crucifereae 1CRUF, Chenopodioideae 1CHES, (particularly endive CICHEN, chicory CICHEN, witloof CICIF), lamb's lettuce VLLLO, Italian corn salad VLLER	Liliaceae 1LILF, Umbelliferae 1UMBF, Brassicaceae 1CRUF, Solanaceae 1SOLF	ornamentals, fresh herbs

Can be used in some circumstances to support indicator crop

Table 4: DISEASES ON UMBELLIFEROUS CROPS

DAUCA Carrot *Daucus carota*, APUGV Celery *Apium graveolens* and APUGR Celeriac *Apium graveolens* var. *rapaceum*, FOEVD Fennel *Foeniculum vulgare* var. *dulce*, PAVSA Parsnip *Pastinaca sativa*, PARCR Parsley *Petroselinum crispum*, CORSA Coriander *Coriandrum sativum*, CRYCA Caraway Caraway

Pests		Crops: within the Umbelliferae		Crops: outside the Umbelliferae	
1	2	3	4	5	6
Pathogen species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Alternaria dauci</i> ALTEDA; <i>Alternaria radicina</i> ALTERA <i>Alternaria</i> sp. ALTESP	Leaf spot/blight	Carrot DAUCA	To all umbelliferous	Host crops of <i>Alternaria</i> sp	Herbs Salsify TROPS Crops for seed production
<i>Cercospora carotae</i> , CERCCA					
<i>Pythium</i> sp PYTHSP	Cavity spot	DAUCA Carrot <i>Daucus carota</i> or CORSA Coriander <i>Coriandrum sativum</i> or PARCR Parsley <i>Petroselinum crispum</i>	To all umbelliferous		

<i>Stemphylium</i> sp. STEMSP	Leaf blight	carrot DAUCA	Fennel, Celeriac APUGR	Asparagus ASPSS	
<i>Helicobasidium brebissonii</i> , HLCBBR	Violet root rot	Carrot DAUCA	To all umbelliferous		
<i>Rhizoctonia carotae</i> , RHIZCA	Storage disease	Any umbelliferous	To all umbelliferous		
<i>Erysiphe heraclei</i> , ERY SHE	Powdery mildew	Any umbelliferous	To all umbelliferous	Cucumber CUMSA	Black salsify SCVHI Herbs
<i>Mycocentrospora acerina</i> , MYCCAC		Carrot DAUCA	To all umbelliferous		
<i>Phytophthora</i> sp. PHYTSP	Ring rot	Any umbelliferous	To all umbelliferous		
<i>Phoma</i> sp. PHOMSP		Any umbelliferous	To all umbelliferous	Leafy vegetables	
<i>Plasmopara crustosa</i> <i>umbrelliferarum</i> PLASCR, <i>Peronospora</i> sp. PEROSP	Downy Mildew	Fennel FOESS Parsley PARCR	To all umbelliferous		

<i>Septoria sp</i> SEPTSP	Septoria leaf spot disease	Any umbelliferous (except carrot DAUCA)	To all umbelliferous		
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests					
<i>Pythium violae</i> , PYTHVI		Carrot DAUCA	Fennel FOESS, Celeriac APUGR	Any other crop*	
<i>Botryotinia fuckeliana</i> , BOTRCI		Celeriac APUGR	Fennel FOESS, Celeriac APUGR	Any other crop*	
<i>Pythium</i> PYTHSP, <i>Rhizoctonia</i> RHIZSP, <i>Phytophthora</i> PHYTSP, <i>Fusarium</i> FUSASP	Damping-off diseases	Carrot DAUCA		Spinach SPQOL, Sugarbeet BEAVA	Herbs
<i>Sclerotinia sclerotiorum</i> , SCLESC	White mould	Carrot DAUCA	Fennel FOESS, Celeriac APUGR Parsley PARSS		
<i>Thanatephorus cucumeris</i> , RHIZSO/ <i>Rhizoctonia</i> RHIZSP,	Crown and root rot	Carrot DAUCA		Lettuce LACSA, Brassica 1BRSG	
<i>Streptomyces scabiei</i> , STRESC	potato scab	Carrot DAUCA		Potato SOLTU	

<i>Xanthomonas hortorum</i> pv. <i>Carotae</i> , XANTCR	bacterial leaf blight	Carrot DAUCA	Fennel FOESS, Celeriac APUGR		
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Table 5: DISEASES ON CUCURBITACEAE

CUMSC Cucumber *Cucumis sativus*, CUUPG Courgette *Cucurbita pepo* var. *giromontiina* (including zucchini and marrow squash), CUUPE Marrow *Cucurbita maxima* (Squash and pattypan/scallop squash and gourds), CUUPM Pumpkin *Cucurbita pepo* var. *melo*, CUMME Melon *Cucumis melo*, CITLA Water Melon *Citrullus lanatus*, Thorn melon (*Cucumis metuliferus*), Karela (*Momordica charantia*), Butter nut squash (*Cucurbita moschata*)

Pest		Crop: within the Cucurbitaceae		Crops: outside Cucurbitaceae	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Pyrenochaeta lycopersici</i> PYRELY	Root rot	Water Melon CUMME	All crops within the group	Tomato LYPES, Potato SOLTU	Tomato LYPES
<i>Pseudoperonospora cubensis</i> PSPECU	Downy mildew	Cucumber CUMSC or water Melon CUMME	All crops within the group		Basil OCIBA, Sage SALSS, Herbs
<i>Alternaria</i> spp. ALTESP <i>A. cucumerina</i> ALTECU	Leaf blight	Cucumber CUMSC or water Melon CITLA	All crops within the group	Strawberry FRASS, Tomato LYPES	Auberginesolme, Turnip BRSRR , Scorzonera 1SCVG, Wild Lettuce LACSE, Endive CICEN, Chicory CICIN, Fennel FOESS, Sweet Pepper CPSAN, Umbelliferous Herbs

<i>Cladosporium</i> spp. CLADSP	Scab	Cucumber CUMSC or water Melon CITLA,	All crops within the group	Tomato LYPES	Spinach BEAVV
<i>Erysiphe</i> spp. ERYSSP, <i>Golovinomyces</i> <i>cichoracearum</i> ERYSCI or ¹ <i>Sphaerotheca</i> spp. SPHRSP, <i>Sphaerotheca fuliginea</i> SPHRFU	Powdery mildew	Water Melon CITLA or Cucumber CUMSC	All crops within the group	Tobacco NIOTA	Endive CICEN, Lambs lettuce VLLLO, Chicory CICIN, Tobacco NIOSS, Parsley PARSS
<i>Didymella bryoniae</i> DIDYBR	Gummy stem blight Black stem rot	Water Melon CITLA or Cucumber CUMSC	All crops within the group	Cabbage BRSOL, Raspberry RUBID	
<i>Colletotrichum</i> spp. COLLSP	Anthrachnose	Water Melon CITLA or Cucumber CUMSC	All crops within the group	Tomato LYPES, Beans PHSSS	Spinach SPQOL, Sweet pepper CPSAN, Beans PHSSS, Peas PIBSS
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests					
<i>Fusarium oxysporum</i>	Fusarium wilt	Water Melon CITLA	All crops within the group	tomato LYPES	Tomato LYPES, Carnations

<i>Fusarium oxysporum</i> f.sp. <i>radicis-cucumerinum</i> FUSARC	Fusarium crown and stem rot	Cucumber CUMSC	All crops within the group	tomato LYPES, asparagus	Sweet basil OCIBA, Tomato LYPES
<i>Verticillium</i> spp. VERTSP	Verticillium wilt	Cucumber CUMSC or water melon CITLA or zucchini CUUPG	All crops within the group	tomato LYPES, potato SOLTU, strawberry FRASS, sunflower HELAN, cotton GOSHI	chrysanthemum 1CHYG, pelargonium 1PELG, Tomato LYPES, Tobacco NIOSS
<i>Botrytis</i> spp. BOTRSP, <i>Botrytis cinerea</i> BOTRCI	Grey mould	cucumber CUMSC or water melon CITLA	All crops within the group	tomato LYPES, strawberry FRASS, fabaceae 1LEGF, eggplant SOLME, sweet pepper CPSAN, chilli pepper CPSFR	chrysanthemum 1CHYG, begonia, pelargonium PELSS, Tomato LYPES, Lettuce LACSS, Beans PHSSS, peas, Basil OCIBA, rosmarin RMSS
<i>Pythium</i> spp. PYTHSP	Damping off/root rot	cucumber CUMSC	All crops within the group	Most vegetable crops are susceptible	susceptible minor vegetable crops, Tomato LYPES, Lettuce LACSS, Spinach BEAVV

<i>Rhizoctonia solani</i> RHIZSO	Damping off/root rot	Water melon CITLA or cucumber CUMSC	All crops within the group	Most vegetable crops are susceptible, strawberry FRASS, tobacco NIOTA, potato SOLTU	begonia BEGSS, chrysanthemu m 1CHYG, saintpaulia 1SNPG, susceptible minor vegetable crops, Tomato LYPES, Roman chamomile ANTNO, Rosmarin RMSS
<i>Sclerotinia sclerotiorum</i> SCLESC	White mould	Water melon CITLA or cucumber CUMSC	All crops within the group	Most vegetable crops are susceptible, field beans VICFX, potato SOLTU	turnip BRSRR, susceptible minor vegetable crops, Lettuce LACSS
<i>Phytophthora</i> (<i>Phytophthora</i> <i>nicotianae</i> PHYTNN, <i>P. capsici</i> PHYTCP, <i>P.</i> <i>cactorum</i> PHYTCC etc.)	Blight of sweet pepper	Water Melon CITLA or cucumber CUMSC	All crops within the group		Sweet pepper CPSAN

Table 6: DISEASES ON VEGETABLE BRASSICAS:

Leafy brassicas: BRSOA kale *Brassica oleracea* var. *acephala* including collards and curly kale *Brassica oleracea* var. *sabellica* BRSOC; BRSPK Peking cabbage *Brassica pekinensis*; BRSCH *B. chinensis* [synonyms: *B. rapa* subsp. *chinensis*; *B. chinensis* var. *parachinensis*; *B. parachinensis*]; BRSNO Mitzuna *Brassica rapa* subsp. *nipposinica*; BRSPE Komatsuna *Brassica perviridis*; SINSP mustard *Sinapis* sp. (red, white brown black); DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *sativa*.

Head brassicas: (Head) Cabbage (includes red BRSOR *Brassica oleracea* var. *capitata* f. *rubra* and white *Brassica oleracea* var. *capitata* f. *alba* BRSOL); BRSON *Brassica oleracea* var. *capitata* f. *conica*; BRSOB Brussels sprouts *B. oleracea* var. *gemmifera*; BRSOS Savoy cabbage *B. oleracea* var. *sabauda*.

Flowerhead brassicas: (Flowering brassicas); BRSOB Cauliflower *B. oleracea* var. *botrytis* subvar. *cultiflora*, BRSOK Broccoli, Calabrese, cima di rapa *B. oleracea* var. *italica*; BRSAG Chinese kale (Chinese broccoli) *Brassica alboglabra*.

Root / Stem brassicas and radish crops: BRSNA Swedes *B. napus* var. *napobrassica*, BRSRR Turnips *B. rapa*, RAPSS Radishes *Raphanus* spp. (including red, white, Black Spanish radish); RAPSRR Small radish *Raphanus sativus*; RAPSNN Garden radish *Raphanus sativus* var. *niger*; ARWLA Horseradish *Armoracia lapathifolia*; BRSOG Kohlrabi, *B. oleracea* var. *gongylodes*.

Pests		Crops: within the Vegetable Brassicas		Crops: outside the Vegetable Brassicas	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Alternaria</i> spp. (<i>Alternaria brassicicola</i> ALTEBI, <i>A. brassicae</i> ALTEBA, <i>A. raphani</i> ALTERP)	<i>Alternaria</i> leaf spot	Cauliflower BRSOB or broccoli BRSOK or Brussels sprouts BRSOB	Leafy and flower head and root brassicas	Oilseed rape BRSNN, Mustard SINSS	Carrot DAUCS Tomato LYPES

<i>Pseudocercospora capsellae</i> (= <i>Mycosphaerella capsellae</i>) PSDCCA	White leaf spot	Head cabbage BRSON	Leafy and flower head and root brassicas		
<i>Pyrenopeziza brassicae</i> PYRPBR	Light leaf spot	Kales or Collards BRSOA	Leafy and flower head brassicas	Oilseed rape BRSNN	Oilseed rape BRSNN
<i>Mycosphaerella brassicicola</i> MYCOBR	Ring spot	Kales or Collards BRSOA or Brussels sprouts BRSOF	Flower head brassicas and leafy brassicas		Cucumber CUMSC
<i>Colletotrichum higginsianum</i> COLLHG	Anthrachnose	Head cabbage BRSON or turnip BRSRR	Leafy and root brassicas	Mustard SINSS	

<i>Botryotinia fuckeliana</i> BOTRCI	Gray mold	Head cabbage BRSON or Brussels sprouts		Lettuce LACSA Strawberry FRASS, all cucurbit crops 1CUCF, rose ROSSS, artichoke CYUSC, pea PIBSS, potato SOLTU, leek ALLPO, garden bean PHSVX, grapes VITVI, Beans PHSSS,	Lettuce LACSA, Tomato LYPES
<i>Erysiphe cruciferarum</i> ERYSCR, <i>Erysiphe polygoni</i> ERYSPG	Powdery mildews	Head cabbage BRSON or Brussels sprouts BRSOF	Leafy brassicas and flower head brassicas, root brassicae, Swede BRSNA	Cucurbits 1CUCF, Oilseed rape BRSNN Rocket (<i>Diplotaxis erucoides</i> DIPER and <i>Eruca vesicaria</i> subsp. <i>sativa</i> ERUVE)	
<i>Peronospora parasitica</i> PEROPA <i>Hyaloperonospora brassicae</i> HPERBR	Downy mildews	BRSOK Broccoli or Cauliflower BRSOB(any crop where use is on seedlings)	Leafy brassicas, Head cabbages	Lettuce LACSS Onion ALLCE, Oilseed rape BRSNN	

<i>Plasmodiophora brassicae</i> PLADBR	Club root of cabbage	BRSOK Broccoli or Cauliflower BRSOB or Kales or Collards BRSA	Flower head brassicas and leafy brassicas, Head cabbages	Oilseed rape BRSNN, mustard SINSS	
<i>Leptosphaeria maculans</i> = <i>Phoma lingam</i> LEPTMA	Black leg	BRSOK Broccoli or Cauliflower BRSOB or Kales or Collards BRSA	Flower head brassicas and leafy brassicas, Head cabbages	Oilseed rape BRSNN	Origano ORISS, Fennel FOESS
The following extrapolation possibilities are proposed to be addressed intables covering generic pests					
<i>Rhizoctonia solani</i> RHIZSO <i>Fusarium</i> spp. FUSASP <i>Pythium</i> spp. PYTHSP	Damping off	Any vegetable brassica	Leafy and flower head and head and root brassicas	Any relevant crop*	Lettuce LACSS, Tomato LYPES
<i>Sclerotinia sclerotiorum</i> SCLESC <i>Sclerotinia minor</i> SCLEMI	Stem rot	BRSOK Broccoli or Cauliflower BRSOB or Kales or Collards BRSA	Flower head brassicas, leafy brassicas and Head cabbages	Lettuce LACSA, oilseed rape BRSNN	Oilseed rape BRSNN, Lettuce LACSS, Tomato LYPES

<i>Acidovorax</i> <i>valerianella</i> ACVRVA, <i>Pseudomonas</i> sp. ERWICA, <i>Xanthomonas</i> sp. XANTSP	Bacterial disease	Any vegetable brassica	All vegetable brassica		Lettuce LACSS, Herbs
<i>Verticillium</i> spp. VERTSP	Verticillium wilt	Brussels sprouts BRSOF or Head cabbages BRSON		Tomato LYPES, Eggplant SOLME, Capsicum CPSSS	

Table 7: DISEASES ON ALLIUM VEGETABLES

ALLCE Onion *Allium cepa*, ALLAS Shallots *Allium cepa* *Aggregatum* types, ALLAH Silverskin onions *Allium ampeloprasum* f. *holmense*, ALLFI Welsh onion (Spring onion, Bunching onion) *Allium fistulosum*, ALLSC Chives *Allium schoenoprasum*, ALLSA Garlic *Allium sativum*, ALLPO Leek *Allium porrum*.

Pest		Crops: within allium vegetables		Crops: outside allium vegetables	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Botryotinia porri</i> BOTTP0, <i>B. squamosa</i> SCLESQ, <i>B. alli</i> BOTRAL	Grey mould bulb rot and collar rot	Onion or Garlic	All Allium ALLSS		
<i>Fusarium oxysporum</i> (f.sp. <i>Cepae</i>) FUSACE	Root rot, Pink root	Onion or Garlic	All Allium ALLSS	Allium ornamental bulbs	Allium ornamental bulbs
<i>Pyrenochaeta terrestris</i> PYRETE	Pink root	Onion or Garlic	All Allium ALLSS		
<i>Davidiella alli-cepae</i> (=Heterosporium <i>alli</i>) CLADAC	Onion leaf spot	Onion or Garlic	All Allium ALLSS	Allium ornamental bulbs	Allium ornamental bulbs

<i>Peronospora destructor</i> PERODE	Downy mildew of onion	Onion or Garlic	All Allium ALLSS		Allium ornamental bulbs
<i>Phytophthora porri</i> PHYTPO	Neck or bulb rot	Leek ALLPO or Onions	Onion ALLCE Welsh Onion ALLFI, Chives ALLSC,		
<i>Stromatinia cepivorum</i> (=Sclerotium cepivorum) SCLOCE	White rot of onion	Onion or Garlic	All Allium ALLSS		
<i>Urocystis colchici</i> (=Urocystis cepulae) UROCCE	Smut of onion	Onion or Garlic	All Allium ALLSS		
<i>Alternaria porri</i> ALTEPO <i>Pleospora allii</i> (=Stemphylium vesicarium) PLEOAL	Purple blotch Leaf blight	Onion or Garlic	All Allium ALLSS	Tomato LYPES PotatoSOLTU Pear PYUSS (only for PLEOAL), asparagus ASPSS, allium ornamental bulbs, arachis sp. ARHSS	Tomato LYPES Allium ornamental bulbs, Arachis sp. ARHSS

<i>Puccinia allii</i> PUCCAL, <i>P. porri</i> PUCCPO	Rust	Onion or Garlic	All allium ALLSS		Mint MENSS, Tarragon ARTDR
<i>Collectotrichum dematium</i> f.sp circinans	Smudge	Onion ALLCE	All Allium ALLSA		
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests					
<i>Pythium</i> sp. PYTHSP	Damping off	Onion or Garlic	Garlic ALLSA, shallot ALLAS, leek ALLPO		Tomato LYPES
<i>Rhizoctonia</i> spp. RHIZSP (soil borne)	Rhizoctonia rot	Leek ALLPO or onions	All Allium ALLSA		Tomato LYPES

Table 8: DISEASES ON CHENOPODIACEOUS VEGETABLES

Spinach *Spinacia oleracea* SPQOL, Chard *Beta vulgaris* BEAVV, Swiss chard *Beta vulgaris subsp. vulgaris var. flavescens* BEAVF, Beetroot *Beta vulgaris subsp. vulgaris var. conditiva* BEAVD, Garden beet *Beta vulgaris subsp. vulgaris var. lutea* BEAVL, Quinoa *Chenopodium quinoa* CHEQU, White goosefoot (wild spinach) *Chenopodium album* CHEAL

Diseases		Crops: within the chenopodiaceous vegetables		Crops: outside the chenopodiaceous vegetables	
1 Pathogen species	2 Disease group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Aphanomyces cochlioides</i> APHACO <i>Aphanomyces cladogamus</i> APHACL	Root rot	Beetroot BEAVD or Spinach BEAVV	To all chenopodiaceous vegetables	Sugarbeet BEAVA*	
<i>Phytophthora</i> PHYTSP				Sugarbeet BEAVA	
<i>Pythium</i> PYTHSP, <i>Fusarium</i> FUSASP				Sugarbeet BEAVA, Carrot DAUCA, Lettuce LACSA	Carrot DAUCA, Lettuce LACSA, Rocket ERUVE/DIPER, Fennel FOEVA
<i>Thanatephorus cucumeris</i> RHIZSO				Sugarbeet BEAVA, Lettuce LACSA, Brassica 1BPSG, Carrot	
<i>Pleospora betae</i> PLEOBJ				Sugarbeet BEAVA*, Any umbelliferous (Phoma)	Any umbelliferous
<i>Cercospora beticola</i>	Cercospora Leaf spot	Spinach	To all chenopodiaceous vegetables		
	Powdery mildew	Spinach	To all chenopodiaceous vegetables		

Table 9: DISEASES ON ROOT, STEM AND TUBER VEGETABLES

Cassava roots/manioc *Manihot esculenta* MANES, Sweet potatoes *Ipomoea batatas* IPOBA, Yams *Dioscorea spp.* DIUSS, Arrowroots *Maranta arundinacea* MARAR, Taro *Colocasia esculenta* CXSES

Diseases		Crops: within Tropical root and tuber vegetables		Crops: outside Tropical root and tuber vegetables	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Drechslera euphorbiae</i> (= <i>Helminthosporium euphorbiae</i>) DRECEU	Silvery gall	Sweet potatoes IPOBA	All tropical root vegetables	Potato SOLTU	
<i>Phoma sp.</i> PHOMSP	Canker, Phoma leaf spot	Yam DIUSS		Potato SOLTU	
<i>Colletotrichum sp.</i> COLLSP	Anthraxnose			Potato SOLTU, Tomato LYPES	
<i>Phytophthora colocasiae</i> PHYTOO	Leaf blight	Taro CXSES		Potato SOLTU, Tomato LYPES	

Table 10: DAMPING-OFF, SOIL AND AIRBORN FUNGAL DISEASES

Table a Extrapolation table for damping off effects

Diseases		Cr	
1 Pest species	2 Pest group name	3 Indicator crops <i>Data from any other relevant crop, if available, can support (reduced data) the indicator crop</i>	4 Extrapolation to other crops or crop groups
<i>Pythium</i> sp. PYTHSP <i>Oomycetes</i> 1OOMYC	Damping off	Lettuce LACSA or vegetable brassicae or Cucumber CUMSA or Melon CUMME or Spinach SPQOL or Beet BEASS or Tomato LYPES	All crops where damping off caused by Oomycetes appear
<i>Aphanomyces</i> sp. APHASP		Pea PIBSX or Sugar beet BEAVA	Other leguminous crops Other beet crops (<i>Beta</i> sp. BEASS), Chenopodioideae 1CHES
<i>Alternaria</i> sp. ALTESP		Head cabbage BRSON or Tomato LYPES or Pepper CPSAN or Cucurbitaceae 1CUCF	All crops where alternaria damping-off appear
<i>Fusarium</i> sp. FUSASP		Tomato LYPES or Cucurbitaceae 1CUCF (both grown in the soil)	All crops where Fusarium damping off appear
<i>Thanatephorus cucumeris</i> (= <i>Rhizoctonia solani</i>) RHIZSO		Potato SOLTU (AG3, AG2-1), or Lettuce LACSA (AG4), or Cucurbitaceae 1CUCF (in soil) (AG4 (AG5)), or Vegetable brassica (AG2-1, AG4) or Beets BEAVD (AG2-2, AG4, AG1, AG3, AG5) or Fabaceae 1LEGF (AG4, AG2-2) or Strawberry FRASS	All crops where damping off caused by the same AG-groups appear

Table b Extrapolation table for other crop effects other than damping off

Diseases		Crops	
1 Pest species	2 Pest group name	3 Indicator crops <i>Data from any other relevant crop, if available, can support (reduced data) the indicator crop</i>	4 Extrapolation to other crops or crop groups
<i>Alternaria</i> sp. ALTESP	Leaf spots	Chinese cabbage BRSPK or Carrot DAUCA or Potato SOLTU	All crops where alternaria appear
	Fruit spot	Tomato LYPES	All crops where alternaria appear
<i>Fusarium</i> sp. FUSASP	Root rot and wilt	Any relevant crop	Any crop within the same crop botanical family
<i>Pythium</i> sp. PYTHSP	Root rot	Any relevant crop	Any crop within the same crop botanical family
<i>Phytophthora</i> sp. PHYTSP (except <i>P. infestans</i>)	Downy mildew	Potato SOLTU or Tomato LYPES or cucurbitaceae (depending on <i>P.</i> species)	Any other solanaceae or cucurbitaceae or to other crops with reduced data (depending on <i>P.</i> species)
<i>Phytophthora cinnamomi</i> PHYTCN	Phytophthora root rot	<i>Chamaecyparis</i> sp. CHCSS	Any relevant crop

Table 11: Seed borne diseases

Seed borne diseases		Crops	
1 Pest species	2 Pest group name	3 Indicator crops <i>Data from any other relevant crop, if available, can support (reduced data) the indicator crop</i>	4 Extrapolation to other crops ¹
<i>Alternaria</i> sp. ALTESP e.g. <i>A. alternata</i> ALTEAL <i>A.dauci</i> ALTEDA <i>A.brassicae</i> ALTEBA <i>A.brassicicola</i> ALTEBI <i>A.raphani</i> ALTERP <i>A.cichorii</i> ALTECC <i>A.porri</i> ALTEPO <i>A.cucumerina</i> ALTECU <i>A.solani</i> ALTESO	Leaf spot	Tomato LYPES or Any Umbelliferous or Any brassica vegetable or Any Asteraceae 1COMF or Any Allium ALLSS or Cucumber CUMSC or Melon CUMME or Fabaceae 1LEGF	To all host crops of <i>Alternaria</i> or Stemphyliose
<i>Stemphylium</i> sp. STEMSP <i>Pleospora herbarum</i> (= <i>Stemphylium botryosum</i>) PLEOHE	Stemphyliose leaf spot/blight		
<i>Cercospora</i> sp. CERCSP e.g. <i>C. beticola</i> CERCBE, <i>C.kikuchii</i> <i>C.apii</i> CERCAP, <i>C.foeniculi</i> (= <i>Passalora puncta</i>) CERCPE, <i>C. carotae</i> CERCCA	Leaf spot	Any Chenopodiaceae 1CHES or Fabaceae 1LEGF or Umbelliferous 1UMBF	To all host crops of <i>Cercospora</i>

b. EXTRAPOLATION TABLES FOR EFFICACY OF INSECTICIDES

Table 1: INSECTICIDES - PESTS ON CUCURBITACEAE

Cucumber *Cucumis sativus* CUMSC, Courgette *Cucurbita pepo* var. *giromontiina* (including zucchini and marrow squash) CUUPG, Marrow *Cucurbita maxima* (Squash and pattypan/scallop squash and gourds) CUUPE, Pumpkin *Cucurbita pepo* var. *melopepo* CUUPM, Melon *Cucumis melo* CUMME, Water Melon *Citrullus lanatus* CITLA

Pest		Crop: within the Cucurbitaceae		Crops: outside Cucurbitaceae	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<u><i>Bemisia tabaci</i></u> <i>Trialeurodes</i> spp.	Whiteflies	water melon or courgette	All crops within the crop group	Phaseolus spp., cotton , strawberry , Solanaceous crops	Poinsettia , Gerbera spp. asteracea, rose , tobacco, lettuce, rubus spp., ribes spp.
<u><i>Liriomyza trifolii</i></u> , <i>Liriomyza</i> spp.	Dipteran leaf miners	water melon or courgette	All crops within the crop group	Phaseolus spp., field bean, lettuce, Solanaceous crops	rhubarb, spinach, celeriac, celery, lambs lettuce, Gerbera spp., chrysanthemum, gypsophila

<i>Delia platura</i>	Root and soil flies	water melon or courgette	All crops within the crop group	field bean , potato , soybean, Phaseolus spp., spinach, asparagus	Freesia
<i>Aphis gossypii</i> and <i>Myzus persicae</i> , <i>Myzus</i> spp.	Aphids	water melon or courgette	All crops within the crop group	strawberry, cotton , Solanaceous crops, Phaseolus spp.	Chrysanthemum, hibiscus, rose
<i>Frankliniella</i> spp., <i>Thrips</i> spp.	Thrips	water melon or courgette	All crops within the crop group	strawberry, Solanaceous crops, Phaseolus spp., cotton, flowering ornamentals	
<i>Tetranychus urticae</i>	Spider mites	water melon or courgette	All crops within the crop group	Phaseolus spp. , ornamentals, cotton , soybean, strawberry, Solanaceous crops	Passion fruit

Table 2: PESTS ON VEGETABLE BRASSICAS

Leafy brassicas: BRSOA kale *Brassica oleracea* var. *acephala* including collards and curly kale *Brassica oleracea* var. *sabellica* BRSOC; BRSPK Peking cabbage *Brassica pekinensis*; BRSCH *B. chinensis* [synonyms: *B. rapa* subsp. *chinensis*; *B. chinensis* var. *parachinensis*; *B. parachinensis*]; BRSNO Mitzuna *Brassica rapa* subsp. *nipposinica*; BRSPE Komatsuna *Brassica perviridis*; SINSP mustard *Sinapis* sp. (red, white brown black); DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *sativa*.

Head brassicas: (Head) Cabbage (includes red BRSOR *Brassica oleracea* var. *capitata* f. *rubra* and white *Brassica oleracea* var. *capitata* f. *alba* BRSOL); BRSON *Brassica oleracea* var. *capitata* f. *conica*; BRSOF Brussels sprouts *B. oleracea* var. *gemmifera*; BRSOS Savoy cabbage *B. oleracea* var. *sabauda*.

Flowerhead brassicas: (Flowering brassicas); BRSOB Cauliflower *B. oleracea* var. *botrytis* subvar. *cultiflora*, BRSOK Broccoli, Calabrese, cima di rapa *B. oleracea* var. *italic*; BRSAG Chinese kale (Chinese broccoli) *Brassica alboglabra*.

Root / Stem brassicas and radish crops: BRSNA Swedes *B. napus* var. *napobrassica*, BRSRR Turnips *B. rapa*, RAPSS Radishes *Raphanus* sp. (including red, white, Black Spanish radish); RAPSR Small radish *Raphanus sativus*; RAPSN Garden radish *Raphanus sativus* var. *niger*; ARWLA Horseradish *Armoracia lapathifolia*; BRSOG Kohlrabi, *B. oleracea* var. *gongylodes*.

Pests		Crops: within Vegetable Brassicas		Crops: outside Vegetable Brassicas	
1	2	3	4	5	6
Pest species	Pest name group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u><i>Delia radicum</i></u> (soil), <i>Delia</i> sp	Root flies	Cauliflower or Turnip or Radish	Leafy and flower head and head brassicas Root brassicas	Onion	Oilseed rape (if a pest problem) , Spinach, Herbs Beans, Onion
<u><i>Delia radicum</i></u> (leaves) <i>D. floralis</i>	Flies	Head cabbage and Brussels sprouts	Leafy brassicas	<u><i>Delia radicum</i></u> (leaves) <i>D. floralis</i>	
<i>Delia radicum</i> (flower buds)	Flies	Broccoli or Cauliflower	Flowerhead brassicas	<i>Delia radicum</i> (flower buds)	

<u><i>Brevicoryne brassicae</i></u> <u><i>Lipaphis erysimi</i></u>	Aphids	Head cabbage	Leaf and flower head and root brassicas	Oilseed rape any other crop for aphids other than <i>Brevicoryne brassicae</i>	Oilseed rape, Lettuce, Tomato, Herbs
<i>Myzus persicae</i>		head cabbage		Lettuce	* for all: Gherkins, Blanched celery and green celery, Courgettes, Patisson, Celeriac, Florence fennel, Fennel, Beetroot, Leek, Rhubarb, Lettuce, Green Belgian endive, Endive, Spinach, Lamb's lettuce, Witloof and chicory roots (root growing culture), French beans, Slicing beans, Runner bean, Parsley, Chervil and Celery leaves, Ornamentals
<u><i>Aleurodes proletella</i></u>	Whiteflies	head cabbage and Brussels sprouts	Leafy and flower head ,savoy cabbage and root brassicas	Ornamentals	Celery
<u><i>Phyllotreta</i> sp.</u>	Flea beetles	Any vegetable brassica	Leafy and flower head and head and root brassicas	Spring oilseed rape, Tomato Cucumber	Oilseed rape (<i>Phyllotreta</i> only), Tomato, Herbs
<u><i>Putella xylostella</i></u> <i>Mamestra brassicae</i> or <i>Pieris brassicae</i> , <i>pieris rapae</i>	Caterpillars	Any vegetable brassica	Leafy and flower head and root brassicas	Oil seed rape	Oil seed rape, Herbs

<i>Meligethes sp.</i>	pollen beetle	Broccoli or Cauliflower	All cabbage species	Oil seed rape* or Mustard	Oilseed rape, Mustard, Herbs
<i>Dasineura sp.</i> , <i>Contarinia nasturtii</i>	Gall midges	Broccoli or Cauliflower	Leafy and flower head and head and root brassicas		Herbs Oilseed rape
<i>Liriomyza sp</i> <i>LIRISP</i> , <i>Phytomyza rufipes</i> <i>PHYYYRU</i> , <i>Scaptomyza flava</i> <i>SCATFL</i>	Stem and leaf miner flies	Any vegetable brassicas	All vegetable brassicas	Oil seed rape BRSNN or Mustard SINSS	Tomato LYPES, Lettuce LACSA, Spinach BEAVV Herbs, Celery APUGV
<i>Ceutorhynchus quadridens</i> (= <i>Ceutorhynchus pallidactylus</i>) <i>CEUTQU</i>	Cabbage weevil	Any vegetable brassicas	All vegetable brassicas	Oil seed rape BRSNN	

Table 3: PESTS ON RHUBARB AND ASPARAGUS

Rhubarb *Rheum rhabarbarum* RHERH, Asparagus *Asparagus officinalis* ASPOF

Pests		Crops: rhubarb and asparagus		Crops: outside rhubarb and asparagus	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Delia platura</i> , <i>Delia florilega</i> , Delia sp.	Rootflies	Asparagus		<i>Phaseolus</i> spp. , <i>Phaseolus</i> spp. and any other crops in which the pest occurs	Cucurbitaceae, Allium sp. Cucurbitaceae, <i>Allium</i> spp.
<i>Platyparea poeciloptera</i> , <i>Ophiomyia simplex</i>	Asparagus flies				
<i>Hypopta caestrum</i>	Caterpillars			Any crop affected by this pest	Any crop affected by this pest
<i>Ostrinia nubilalis</i> ,				Zea mays, <i>Phaseolus</i> spp., Pepper	Pepper
<i>Autographa</i>				Any vegetable brassica,	

<i>gamma</i>				Lettuce, Allium vegetables	
<i>Crioceris asparagi</i> , <i>Crioceris duodecimpunctata</i> , <i>Crioceris sp.</i>	Leaf beetles			Umbelliferous crops and any other crop affected by these pests	Any other crop affected by these pests
<i>Collembola</i>	Collembola			Root brassicas, Cucumber	
<i>Blaniulus guttulatus</i>	Millipedes			Cucumber, Strawberry	

Table 4: PESTS ON LEGUME VEGETABLES

Vicia faba VICFX, *Phaseolus* sp. PHSSS, *Pisum sativum* PIBSX, *Lens culinaris* LENCU, *Cicer arietinum* CIEAR, *Arachis hypogea* ARHHY

Pests		Crop: within Peas and Beans		Crops: outside Peas and beans	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u><i>Myzus persicae</i></u> , <u><i>Aphis fabae</i></u> , <i>Macrosiphum euphorbiae</i> , <i>Aulacorthum solani</i> , <i>Uroleucon sonchi</i> <i>Megoura viciae</i>	Leaf aphids (field conditions)	Any <i>Phaseolus</i> sp. or <i>Vicia</i> sp. or <i>Pisum sativum</i> or chickpea	All <i>Pisum</i> sp. and <i>Phaseolus</i> sp. chickpea, Lentils and <i>Vicia</i> sp	Ornamentals, Peach Chenopodioideae, Cucumber Chinese cabbage, Solanaceae, Strawberry	Herbs, Ornamentals, Solanaceae, Strawberry
<u><i>Aphis gossypii</i></u> and two other aphid species among <i>Myzus persicae</i> , <i>Aphis</i> sp., <i>Macrosiphum euphorbiae</i> , <i>Aulacorthum solani</i>	Leaf aphids (protected conditions)	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp. , Lentils	Cucurbitaceae*, Ornamentals, Solanaceae	Herbs, Ornamentals, Solanaceous crops, Strawberries
<i>Acyrtosiphon pisum</i> or	Leaf aphids	Any <i>Pisum</i> sp.	All <i>Phaseolus</i> sp.		

<i>Acyrtosiphon</i> sp.					
<i>Delia</i> sp.	Bean seed fly	Any <i>Phaseolus</i> sp.	All <i>Pisum</i> sp. and <i>Phaseolus</i> sp., <i>Vicia</i> sp., Chickpea	Allium vegetables	Asparagus , Spinach , Allium vegetables, Cucurbitaceae Freesia
<i>Liriomyza</i> sp., <i>Chromatomyia</i> syngenesiae, <i>Phytomyza</i> sp.	Leaf miner flies	Any <i>Phaseolus</i> sp. or <i>Pisum</i> sp., Chickpea	All <i>Phaseolus</i> sp. or <i>Pisum</i> sp., Chickpea, <i>Vicia</i> sp	Tomato *, Ornamentals, Leafy vegetables, Vegetable brassicas and cucumber	Tomato, Cucurbitaceae, Alliaceae
<i>Contarinia pisi</i> , <i>Contarinia</i> sp.	Gall midge	Any <i>Pisum</i> sp.	Lentil, All <i>Vicia</i> sp	Vegetable brassica	
<i>Tetranychus urticae</i>	Spider mites	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp.	Cucurbitaceae, Ornamentals	Cucurbitaceae, Ornamentals, Tomato
<i>Chrysodeixis chalcites</i>	Caterpillars	Any <i>Phaseolus</i> sp. or <i>Pisum</i> sp., chickpea	All <i>Phaseolus</i> sp. or <i>Pisum</i> sp., Chickpea, Lentils	<i>Chrysodeixis chalcites</i> in any crop*	
<i>Spodoptera exigua</i>				<i>Spodoptera exigua</i> in any crop*	
<i>Autographa gamma</i> or				<i>Autographa gamma</i>	

<i>Mamestra</i> sp.				or <i>Mamestra</i> sp. in any crop*	
<u><i>Ostrinia</i> sp.</u> , <i>Helicoverpa</i> <i>armigera</i>				Cucurbitaceae , Solanaceous crops, Maize	
<u><i>Cydia nigricans</i></u>	Caterpillars	Any <i>Pisum</i> sp.	Lentil, All <i>Pisum</i> sp	Cucurbitaceae	Herbs
<u><i>Bruchus</i> sp.</u> <i>Acanthoscelides</i> sp.	Weevils	Any <i>Pisum</i> sp. or <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp. , Broad beans, Lentil, Field beans, Chickpea and <i>Vicia</i> sp		Pulses forage
<i>Sitona lineatus</i>		Any <i>Pisum</i> sp	All <i>Phaseolus</i> sp. and <i>Vicia</i> sp	Soybean, <i>Lupinus</i> sp	Soybean, <i>Lupinus</i> sp, Pulses forage
<u><i>Frankliniella</i> sp.</u> (except <i>F.</i> <i>occidentalis</i> ¹), <i>Thrips</i> sp. , <i>Kakothrips</i> sp.	Thrips	Any <i>Pisum</i> sp. or <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp., All <i>Pisum</i> sp., <i>Vicia</i> sp	Tomato, Ornamentals, Allium vegetables, Brassica vegetables	Tobacco Ornamentals
<u><i>Ophiomyia</i></u> <u><i>phaseolus</i></u>	Bean fly (Bean stem maggot)	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp., All <i>Pisum</i> sp., <i>Vicia</i> sp and all relevant leguminous crops		

<u>Agrotias sp</u>	Cut worms	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp., All <i>Pisum</i> sp., <i>Vicia</i> sp and all relevant leguminous crops		
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Table 5: PESTS IN UMBELLIFEROUS CROPS

DAUCA Carrot *Daucus carota*, APUGV Celery *Apium graveolens* and APUGR Celeriac *Apium graveolens* var. *rapaceum*, FOEVD Fennel *Foeniculum vulgare* var. *dulce*, PAVSA Parsnip *Pastinaca sativa*, PARCR Parsley *Petroselinum crispum*, CORSA Coriander *Coriandrum sativum*, CRYCA Caraway Caraway

Pests		Crops: within the Umbelliferae		Crops: outside the Umbelliferae	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Aulacorthum solani</i> ; <i>Cavariella aegopodii</i> ; <i>Dysaphis crataegi</i> ; <i>Hyadaphis foeniculi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i> ; <i>Semiaphis dauci</i>	Aphididae	Any umbelliferous	All umbelliferous	Lettuce Cucumber	Black salsify

<i>Pemphigus</i> sp. , <i>Pemphigus phenax</i>	Root aphids	Carrot or Fennel		Lettuce, Chicory	Herbs
<i>Chamaepsila rosae</i> , (syn. <i>Psila rosae</i>)	Carrot root fly	Carrot	All other umbelliferous	Onion, Vegetable brassicas	Herbs, Crops for seed production, Spinach
<i>Depressaria pastinacella</i> , <i>Plutella xylostella</i> , <i>Hepialus humuli</i> , <i>Hepialus lupulinus</i> , <i>Autographa</i> sp. , <i>Mamestra</i> sp. and other caterpillar species	Caterpillars	Celery or Parsley or Caraway	All umbelliferous	Lettuce All brassicas	
<i>Phyllotreta cruciferae</i>	Flea beetles	Any umbelliferous	All umbelliferous	All brassicas*	
<i>Napomyza carotae</i> ,	Mining fly (damaging roots)	Carrot or Celery	All umbelliferous	Lettuce, Lambs lettuce	Herbs Ornamentals Leafy brassicas
<i>Liriomyza</i> sp. , <i>Euleia</i> sp. (= <i>Philophylla</i> sp.)	Mining fly (damaging leaves)				
<i>Trioza apicalis</i> ,	Carrot psyllid	Carrot	Parsnips		
<i>Cixius wagneri</i>	Leafhopper	Celeriac	Carrot, Fennel	Strawberry Ornamentals	Herbs

<i>Thrips sp</i>	Thrips	Fennel	Carrot, celeriac	Leek	
<i>Lygus rugulipennis</i>	Bugs	Carrot, Celery		Cucumber, Lettuce, strawberry	

Table 6: PESTS ON LEAFY VEGETABLES

Asteraceae : LACSA lettuce *Lactuca sativa*, LACSE prickly lettuce *Lactuca serriola*, CICEN endive *Cichorium endivia*, CICIN chicory *Cichorium intybus*, CICIF chicory witloof *Cichorium intybus* var. *foliosum*, TAROF dandelion *Taraxacum officinale*.

Crucifereae : LEPSA garden cress *Lepidium sativum*, BARVE landcress *Barbarea verna*, DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *Sativa*, NAAOF watercress *Nasturtium officinale*, BRSJU leaf mustard *Brassica juncea*.

Chenopodioideae : SPQOL spinach *Spinacia oleracea*, BEAVV chard *Beta vulgaris* subsp. *vulgaris*.

Other: VLLLO lamb's lettuce *Valerianella locusta*, SANMI burnet *Sanguisorba minor*, VERBE cow cress *Veronica beccabunga*, VLLER Italian corn salad *Valerianella eriocarpa*, POROS purslane *Portulaca oleracea* subsp. *sativa*.

Pest		Crop: within the leafy vegetables		Crops: outside leafy vegetables	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Pemphigus bursarius</i>	Aphids	kales	chicory, witloof, lettuce	Carrot, Tomato,	umberliferous herbs,

<i>Nasonovia ribisnigri</i> ^a , <i>Myzus persicae</i> , <i>Macrosiphum</i> sp., <i>Aphis.gossypii</i> , <i>Acyrtosiphon</i> sp., <i>Aulacorthum</i> sp., <i>Uroleucon sonchi</i>		kale	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae (particularly prickly lettuce, dandelion, spinach, chicory, witloof, rocket, chard), Italian corn salad, lamb's lettuce	Cucurbitaceae, Solanaceae, Brassicaceae, leguminous vegetables	Umbelliferae, Alliaceae, ornamentals, fresh herbs
<i>Liriomyza</i> sp., <i>Pegomya</i> sp., <i>Phytomyza</i> sp.	Mining flies	kale	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae (prickly lettuce, spinach, witloof, rocket, chard, lamb's lettuce)	Cucurbitaceae 1, beets, leguminous vegetables, Solanacea	Celery, parsley, ornamentals, fresh herbs
<i>Pegomya hyoscyami</i> (Mangold fly)		Spinach	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae	Beets	
<i>Delia platura</i>	Root flies	Spinach	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae, Lamb's lettuce	Beans, cabbage, umbelliferous vegetables, onion	Fresh herbs
<i>Autographa gamma</i> ., <i>Mamestra</i> sp., <i>Spodoptera</i> sp.	Caterpillars	Lettuce or Kale	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae (particularly prickly lettuce, dandelion, spinach, chicory, witloof, rocket, chard), , lamb's lettuce	Solanaceae, Crucifereae, beans, beets	Umbelliferae, beetroot, fresh herbs, ornamentals

<i>Trialeurodes</i> sp. , <i>Bemisia</i> sp.	Whiteflies	Lettuce or Kale	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae(particularly prickly lettuce , dandelion, rocket),	Cucurbitaceae*, Solanaceae*, strawberry*	Tobacco
<i>Thrips tabaci</i> ., <i>Frankliniella occidentalis</i> , Thysanoptera	Thrips	Lettuce or Kale	Leafy vegetables of the Asteraceae, Crucifereae , Chenopodioideae (particularly, chicory , witloof, rocket),	Solanaceae, Cucurbitaceae, beans, Crucifereae, alliums, ornamentals	Fresh herbs
<i>Lygus rugulipennis</i>	Bishop bug	Lettuce	chicory, witloof, salad rocket	Cucurbitaceae, Crucifereae	

Table 7: PESTS ON ALLIUM VEGETABLES

ALLCE Onion *Allium cepa*, ALLAS Shallots *Allium cepa* *Aggregatum* types, ALLAH Silverskin onions *Allium ampeloprasum* f. *holmense*, ALLFI Welsh onion (Spring onion, Bunching onion) *Allium fistulosum*, ALLSC Chives *Allium schoenoprasum*, ALLSA Garlic *Allium sativum*, ALLPO Leek *Allium porrum*

Pest		Crop: allium vegetables ¹			
1 ¹	2	3 ¹	4	5 ¹	6 ¹
Pest species	Pest group name	Indicator crops within the crop group	Extrapolation to other crops within the group	Extrapolation from crops outside this crop group that enables reduced or no data* on the indicator crops	Extrapolation to crops outside the crop group with reduced or no data*
<i>Delia antiqua</i>	Onion fly	onion	Allium vegetables		herbs and flowered seed crops, herbs

<i>Delia platura</i>	Onion maggot	onion	Allium vegetables	tomato potato cucumber melon garden bean	herbs and flowered seed crops herbs, zucchini gherkin carnation sword lily radish turnip faba bean asparagus spinach
<i>Thrips tabaci</i>	Onion thrips	onion or leek	Allium vegetables	potato lucerne beta beet cucumber melon strawberry cabbage tomato	carnation ornamental crops, gherkin zucchini garden vegetables, herbs and flowered seed crops, herbs, eggplant common fennel sweet pepper
<i>Acrolepiopsis assectella</i>	Leek moth	onion	Allium vegetables		herbs and flowered seed crops

<i>Myzus ascalonicus</i>	Shallot aphid	onion	Allium vegetables	Potato strawberry beta beet lettuce tomato cucumber	herbs, herbs and flowered seed crops, endive eggplant sweet pepper , wild lettuce spinach
<i>Dyspessa ulula</i>	Garlic borer	Onion	Allium vegetables		
<i>Phytomyza gymnostoma</i>	Leaf miners	Onion	Allium vegetables		
<i>Aceria tulipae</i>	Wheat curl mite	Garlic	Shallot		

Table 8: PESTS ON FRUITING SOLANACEOUS CROPS

LYPES Tomato *Solanum lycopersicum*, SOLME Aubergine *Solanum melongena*, CPSAN Sweet Pepper *Capsicum annuum*, CPSFR Chilli *Capsicum frutescens*, PHYSS *Physalis* sp., SOLMU Pepino *Solanum muricatum*

Pests		Crops: within Fruiting Solanaceous crops		Crops: outside Fruiting Solanaceous crops	
Pest species	2 Pest group	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)

<i>Aphis fabae</i>	Aphids	Tomato	Sweet pepper	Potato, Bean, Garden Carrot, Beta Beet, Field Bean, Strawberry	Faba bean , Field bean, Ornamental crops, Garden bean, Tobacco, Lettuce, Potato , Spinach , Tropical root vegetables
<i>Aphis gossypii</i>		Tomato	Eggplant, Sweet pepper	Cucurbitaceae, Strawberry, Lettuce, Cotton	Zucchini, Mallow, Other Ornamental Crops, Citrus, herbs
<i>Myzus persicae</i> <i>Macrosiphum euphorbiae</i>		Tomato	Eggplant , Sweet pepper	Potato, Cabbage, Cucumber, Melon, Lettuce, Strawberry, Rape, Lettuce, Beets	Chicory, Zucchini, Spinach, Citrus, Ornamental Crops: Floral crops (Chrysanthemum, Dahlia, Carnation, Etc.), herbs
<i>Aculops lycopersici</i>	Bud and rust mites	Tomato	Eggplant	Potato	
<i>Polyphagotarsonemus latus</i>	Broad mite	Eggplant	Tomato		Common ivy
<i>Tetranychus sp.</i> <i>Tetranychus evansi</i> <i>Tetranychus urticae</i> ¹	Spider mites	Tomato	Sweet pepper , Eggplant,	Potato, Garden Bean, Cucurbitaceae	Cotton, Relevant seed crops,Ornamentals, Tobacco, Cucurbitaceae, Herbs
<i>Leptinotarsa decemlineata</i>	Colorado beetle	Tomato	Eggplant, sweet pepper	Potato	
<i>Ostrinia nubilalis</i>	European corn borer	Tomato	Eggplant , Sweet pepper	Maize * Fabaceae	Hop, Raspberry, Gladiolus
<i>Phthorimaea operculella</i> , <i>Tuta absoluta</i>	Leaf miners	Tomato	Eggplant	Potato	Tobacco
<i>Liriomyza sp.</i>	Stem and leaf miner flies	Tomato	Sweet pepper, Chilli pepper, Eggplant	Cucumber, Lettuce, Cabbage, Potato, Rape, Garden bean, Melon	Chicory , Celery, Ornamentals (Chrysanthemum), Gerbera, Beta beet, Pea

<i>Helicoverpa armigera</i>	Bollworms	Tomato	Eggplant, Sweet pepper	Maize, Lettuce	Cotton, Tobacco, Artichoke, Carnation, Fabaceae
<i>Autographa gamma</i> , <i>Lacanobia oleracea</i> (= <i>Mamestra oleracea</i>)	Caterpillars	Tomato	Eggplant, Sweet pepper	Potato, Beta beet, Cereals, Maize, Brassicaceae, Beta beet, Lettuce	Flax , Asparagus
<i>Metcalfa prunosa</i>	Leaf hopper	Tomato	Egg plant, Sweet pepper	Potato	Trees and bushes: Magnolia, Olive, Herbs, Ornamentals

c. EXTRAPOLATION TABLES FOR CROP SAFETY OF FUNGICIDES AND INSECTICIDES

The extrapolation tables should be used in conjunction with efficacy extrapolation guidelines. The tables provide detailed lists of acceptable extrapolations organized by crop groups for the regulatory authority and applicants in the context of the registration of plant protection products for minor uses. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. The regulatory authority excludes liability as to the reliability of the information provided through these tables.

For seed treatments, indicator crops should include seeds of similar or smaller size. Specific trials with insecticides and fungicides are not essential for foliar treatment. Observations in efficacy or residue trials are usually acceptable. For seed treatment a germination study on the indicator crop is usually necessary.

Table 1. VEGETABLE BRASSICAS

Treatment type		Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Type of application	Crop	Crop	Crop	Crop
Seed treatment		Cauliflower BRSOB	Leafy and flower head and head and root brassicas	Lettuce LACSA	
Soil treatment		Any			
Foliar treatment	Before heading	Head cabbage			
	After heading	Head cabbage <u>and</u> Broccoli BRSOK <u>or</u> cauliflower BRSOB			

Table 2: LEAFY VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Kale and Spinach BEAVV or Lettuce LACSS	All leafy vegetables	Head brasiccas	
Soil treatment				
Foliar treatment				

Table 3: CUCURBITACEAE

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Cucumber CUMSC or water melon CITLA	All the crops within the crop group		
Soil treatment				
Foliar treatment				

Table 4: ALLIUM VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Onion ALLCE and garlic	All Allium		
Soil treatment				
Foliar treatment				

Table 5: PEAS AND BEANS

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Green grams and French beans or snow peas	All crops within the Crop group		
Soil treatment	French beans PHSSS or Snowpeas PIBSX			
Foliar treatment				

Table 6: UMBELLIFEROUS

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Carrot DAUCSA or coriander CORSA	All crops within the crop group		
Soil treatment				
Foliar treatment				

Table 7: FRUITING VEGETABLES OF SOLANACEAE

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Tomato LYPES	All crops within the crop group		
Soil treatment				
Foliar treatment				

Table 8: RHUBARB AND ASPARAGUS

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Rhubarb RHERH or Asparagus ASPOF	Rhubarb RHERH or Asparagus ASPOF		
Soil treatment				
Foliar treatment				

Table 9: ROOT/STEM TUBER VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Potato and sweet potato	All crops within the crop group		
Soil treatment				
Foliar treatment				

Table 10: CHENOPODIACEOUS VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Spinach BEAVV	All crops within the crop group		
Soil treatment				
Foliar treatment				

d. EXTRAPOLATION TABLES for EFFICACY of HERBICIDES**Table 1: WEEDS IN VEGETABLE BRASSICAS**

Leafy brassicas: BRSOA kale *Brassica oleracea* var. *acephala* including collards and curly kale *Brassica oleracea* var. *sabellica* BRSOC; BRSPK Peking cabbage *Brassica pekinensis*; BRSCH *B. chinensis* [synonyms: *B. rapa* subsp. *chinensis*; *B. chinensis* var. *parachinensis*; *B. parachinensis*]; BRSNO Mizuna *Brassica rapa* subsp. *nipposinica*; BRSPE Komatsuna *Brassica perviridis*; SINSP mustard *Sinapis* sp. (red, white brown black); DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *sativa*.

Head brassicas: (Head) Cabbage (includes red BRSOR *Brassica oleracea* var. *capitata* f. *rubra* and white *Brassica oleracea* var. *capitata* f. *alba* BRSOL); BRSON *Brassica oleracea* var. *capitata* f. *conica*; BRSON Brussels sprouts *B. oleracea* var. *gemmifera*; BRSOS Savoy cabbage *B. oleracea* var. *sabauda*.

Flowerhead brassicas: (Flowering brassicas); BRSOB Cauliflower *B. oleracea* var. *botrytis* subvar. *cultiflora*, BRSOK Broccoli, Calabrese, cima di rapa *B. oleracea* var. *italica*; BRSAG Chinese kale (Chinese broccoli) *Brassica alboglabra*.

Root / Stem brassicas and radish crops: BRSNA Swedes *B. napus* var. *napobrassica*, BRSRR Turnips *B. rapa*, RAPSS Radishes *Raphanus* spp. (including red, white, Black Spanish radish); RAPSRR Small radish *Raphanus sativus*; RAPSNN Garden radish *Raphanus sativus* var. *niger*; ARWLA Horseradish *Armoracia lapathifolia*; BRSOG Kohlrabi, *B. oleracea* var. *gongylodes*.

Table 2: WEEDS IN BETA CROPS

e.g. sugarbeet *Beta vulgaris* subsp. *altissima* var. *saccharifera* BEAVA, chard beet/ Leaf beet *Beta vulgaris* subsp. *vulgaris* var. *cicla* BEAVV, beet root *Beta vulgaris* subsp. *vulgaris* var. *conditiva* BEAVD, fodder beet *Beta vulgaris* subsp. *vulgaris* var. *crassa* BEAVC

W		Crop: within the <i>Beta</i> crops		Crop: outside the <i>Beta</i> crops	
1	2	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no	6 Extrapolation to crops (reduced or no data*)
Amaranthus (<i>Amaranthus retroflexus</i>), Fat hen (<i>Chenopodium album</i>), Common Purslane (<i>Portulaca oleracea</i> , <i>Polygonium spp</i> , <i>Sonchus avensis</i>	Dicotyledons	Any <i>Beta</i> species BEASS	Any <i>Beta</i> species BEASS		Spinach
Love grass <i>Setaria verticillata</i> , <i>Avena fatua</i> –	Monocotyledon				

Table 3: WEEDS IN BULB VEGETABLES (ALLIUM VEGETABLES)

ALLCE Onion *Allium cepa*, ALLAS Shallots *Allium cepa* *Aggregatum* types, ALLAH Silverskin onions *Allium ampeloprasum* f. *holmense*, ALLFI Welsh onion (Spring onion, Bunching onion) *Allium fistulosum*, ALLSC Chives *Allium schoenoprasum*, ALLSA Garlic *Allium sativum*, ALLPO Leek *Allium porrum*.

Weed		Crop: Bulb Vegetables		Crop: outside Bulb Vegetables	
1	2	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
Purslane (<i>Portulaca</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Goose grass (<i>Eleusine indica</i>) Wild oats (<i>Avena fatua</i>), Barnyard grass (<i>Echinochloa crusgalli</i>), Nutsedge (<i>Cyperus spp</i>)	Dicotyledon Monocotyledons Cyperaceae	Bulb onion or Garlic	All bulb vegetables	Any bulb flower or flower bulbs or leek ALLPO	Other similar growing crops

Table 4: WEEDS IN PEAS AND BEANS: *Pisum* spp. PIBSS, *Vicia* spp. VICSS, and *Phaseolus* spp. PHSSS

Weed		Crop: within the peas and beans		Crop: outside the peas and beans	
1	2	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
Pigweed (<i>Amaranthus</i> spp), Sowthistle (<i>Sonchus eraceae</i>), Mexican marigold (<i>Tagetes minuta</i>), Devil's thorn (<i>Emex australis</i>), Thorn apple (<i>Datura stramonium</i>), Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>), Nightshade (<i>Solanum nigrum</i> , <i>Oxalis</i> (<i>Oxalis</i> spp)	Dicotyledons	<i>Phaseolus</i> spp PHSSS or Any <i>Pisum</i> spp. PIBSS or <i>Vicia</i> spp. VICSS except <i>Vicia faba</i> VICFX	All <i>Pisum</i> spp. PIBSS, all <i>Phaseolus</i> spp. PHSSS, all <i>Vicia</i> spp. VICSS , Green grams , <i>Dolichos lablab</i> , cow pea <i>Vigna unguiculata</i>	Soybean GLXMA	Lupin LUPSS, soybean GLXMA

Table 5: WEEDS IN UMBELLIFEROUS CROPS: carrot DAUCA, celery APUGV, celeriac APUGR, fennel FOEVD, parsnip PAVSA, parsley PARCR, coriander CORSA and caraway CRYCA.

Weed		Crop: within the Umbelliferae		Crop: outside the Umbelliferae	
1	2	3	4	5	6
		Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Pigweed (<i>Amaranthus hybridus</i>), black jack (<i>Biden pilosa</i>), oxalis (<i>Oxalis latifolia</i>), chick weed (<i>Stellaria media</i> L) and Common lambsquarter (<i>Chenopodium album</i>), Crabgrass (<i>Digitaria sanguinalis</i>) Yellow nutsedge (<i>Cyperus esculentus</i> L.),					

Pigweed (<i>Amaranthus hybridus</i>), black jack (<i>Biden pilosa</i>), oxalis (<i>Oxalis latifolia</i>), chick weed (<i>Stellaria media</i> L) and Common lambsquarter (<i>Chenopodium album</i>), Crabgrass (<i>Digitaria sanguinalis</i>) Yellow nutsedge (Cyperus esculentus L.),	Dicotyledon Monocotyledon Cyperaceae	Carrot ,	Any umbelliferous e.g Raddish ,	Parsley PARCR, coriander CORSA and caraway CRYCA.	
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E. EXTRAPOLATION TABLES FOR CROP SAFETY OF HERBICIDES

EXTRAPOLATION REGARDING PROTECTED/OUTDOOR SITUATIONS

Please note that where crops may be grown in both protected and field situations, and where significant differences are expected in pest relevance or crop agronomy between indoor and outdoor situations, it is important to generate a proportion of the data on crops grown in both situations to ensure the product has been tested under a suitable range of typical and challenging conditions.

Table 1: WEEDS IN BETA CROPS e.g. sugarbeet *Beta vulgaris* subsp. *altissima* var. *saccharifera* BEAVA, chard beet/ Leaf beet *Beta vulgaris* subsp. *vulgaris* var. *cicla* BEAVV, beet root *Beta vulgaris* subsp. *vulgaris* var. *conditiva* BEAVD, fodder beet *Beta vulgaris* subsp. *vulgaris* var. *crassa* BEAVC

		Crop: within the <i>Beta</i> crops		Crop: outside the <i>Beta</i> crops	
1 Treat ment type		2 Indicator crops	3 Extrapolation to other crops	4 Data from these crops can support the indicator crops (reduced data or no data *)	5 Extrapolation to crops (reduced or no data*)
	Herbicid e group				
Solanum spp, amaranthus (<i>Amaranthus retroflexus</i>), Rag weed (<i>Ambrosia artemisiifolia</i>), Fat hen (<i>Chenopodium album</i>), Common Purslane (<i>Portulaca oleracea</i> , <i>Polvaonium spp</i>	Broadleave d weed Herbicides	Beet root BEAVD	Any Beta species BEASS		

<i>convolvulus arvensis</i> , Love grass <i>Setaria</i> <i>verticillata</i> , <i>Avena fatua</i> – wild oats	Graminicides	Any Beta species BEASS	Any Beta species BEASS		
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Table 2: VEGETABLE BRASSICAS (seeded and planted) a

Treatment type		Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
	Herbicide group	Crop	Crop	Crop	Crop
<u><i>Commelina bengalensis</i></u> , <u><i>Oxalis</i> spp.</u> , <u><i>Brassica napus</i></u> , <u><i>Portulaca oleracea</i></u> , <u><i>Datura stramonium</i></u> , <u><i>Digitaria</i></u>	Broad-spectrum herbicides ¹	Cauliflower BRSOB or broccoli BRSOK or cabbage BRSCH	Leafy ¹ , flower head, head,	Leafy, flower head, head,	
		Any root brassica	root brassicas		
	Graminicides	Any vegetable brassica	Leafy, flower head, head, root brassicas	Leafy, flower head, head, root brassicas	oilseed rape BRSNN

<u>scalarum</u> , <u>Cynodon</u> <u>dactylon</u> , <u>Eleusine indica</u> , <u>Pennisetum</u> <u>clandestinum</u>					
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¹ It is possible to extrapolate from sown to planted brassicas, but not vice versa.

¹ Broad-spectrum herbicides include herbicides with any broad-leaved weed activity.

Table 3: BULB VEGETABLES (seeded and planted) b

		Crop: bulb vegetables			
1		2 ¹	3	4 ¹	5 ¹
Treatment type		Indicator crops within the crop group	Extrapolation to other crops within the group	Extrapolation from crops outside this crop group that enables reduced or no data* on the indicator crops	Extrapolation to crops outside the crop group with reduced or no data*
	Herbicide group				
Purslane (<i>Portulaca Oleraceae</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Thorn apple (<i>Datura stramonium</i>)	Broad-spectrum herbicides ¹	Bulb onion or Garlic under protected conditions	Same specific bulb vegetable in the field		Leek ALLPO
Goose grass (<i>Eleusine indica</i>) Wild oats (<i>Avena fatua</i>), Barnyard grass (<i>Echinochloa crusgalli</i>), Nutsedge (<i>Cyperus spp</i>)	Graminicides	Any seeded bulb vegetable crop	Transplanted onion ALLCE and shallot ALLAS	Leek, ALLPO, Subgroup 009B (Codex groups)	Leek ALLPO

Generally direct seeded crops are more sensitive to phytotoxicity compared to transplanted crops

¹ For the purpose of this extrapolation table, 'Bulb Vegetables' are defined as: garlic, bulb onion, shallot, salad onion.

¹ Note that it is commonly preferable to have data on several of the crops within the crop group, but data on the indicator crop should be available.

¹ Column 5 identifies whether data from other crops against the same weed may enable a reduction in the amount of data required on the indicator crop (or no data on the indicator crop if the other crop is marked with an asterisk (*)). If this column is blank, the use of data from other crops is not possible/relevant.

¹ Where extrapolation to other crops or crop groups is acceptable, then this is indicated in column 6. In column 6 crops marked with an asterisk (*) indicate that no data are required if appropriate data on the indicator crop is present. Note that column 6 is optional and should only be added to, or applied when there are clear possibilities for extrapolation to other crop groups.

Table 4: PEAS AND BEANS *Pisum* spp. PIBSS, *Vicia* spp. VICSS, and *Phaseolus* spp. PHSSS , Pigion pea

		Crop: within the peas and beans		Crop: outside the peas and beans	
1 Treatment type		2 Indicator crops	3 Extrapolation to other crops	4 Data from these crops can support the indicator crops (reduced data or no data *)	5 Extrapolation to crops (reduced or no data*)
	Herbicide group				
Devil's thorn (<i>Emex australis</i>), Thorn apple (<i>Datura stramonium</i>), Macdonald's eye (<i>Galinsoga parviflora</i>),	Broadleaved weed herbicides	<i>Vicia faba</i> VICFX	All <i>Vicia</i> spp. VICSS	Soybean GLXMA	Lupin LUPSS, soybean GLXMA
Black jack (<i>Bidens pilosa</i>), Nightshade (<i>Solanum nigrum</i> , <i>Oxalis</i> spp)	Broadleaved weed herbicides	<i>Phaseolus vulgaris</i> PHSVX	All <i>Phaseolus</i> spp. PHSSS, Cow peas , Green grams , <i>Dolichos lablab</i> , Pigion pea (<i>Cajanus cajan</i>)	Soybean GLXMA	Lupin LUPSS, soybean GLXMA
Pig weed (<i>Amaranthus</i> spp), Sow thistle (<i>Sonchus oleraceae</i>), Mexican marigold (<i>Tagetes minuta</i>),	Broadleaved weed herbicides	<i>Pisum sativum</i> PIBSX	All <i>Pisum</i> spp. PIBSS	Soybean GLXMA	Lupin LUPSS, soybean GLXMA

Crabgrass (<i>Digitaria</i> spp), Barnyard grass (<i>Echinochloa crusgalli</i>), Nutsedge (<i>Cyperus</i> spp),	Graminicides	Any pea or bean	All peas and beans	Soybean GLXMA	Lupin LUPSS, soybean GLXMA
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Table 5: UMBELLIFEROUS CROPS: carrot DAUCA, celery APUGV, celeriac APUGR, fennel FOEVD, parsnip PAVSA, parsley PARCR, coriander CORSA, and caraway CRYCA.

		Crop: within the umbelliferous crops		Crop: outside the umbelliferous crops	
1 Treatment type		2 Indicator crops	3 Extrapolation to other crops	4 Data from these crops can support the indicator crops (reduced data or no data *)	5 Extrapolation to crops (reduced or no data*)
	Herbicide group				
Pigweed (<i>Amaranthus hybridus</i>) Black jack (<i>Bidens pilosa</i>) oxalis (<i>Oxalis latifolia</i>) Common lambsquarter (<i>Chenopodium album</i>)	Broadleaf weed herbicides	Carrot (DAUCA) and Parsnip (PAVSA) or Coriander (CORSa)	All umbelliferous crops (1UMBF)		
Crabgrass (<i>Digitaria sanguinalis</i>) Yellow nutsedge (<i>Cyperus esculentus</i>).	Graminicides	Carrot and any other umbelliferous crop	All umbelliferous crops		

F. GENERIC EXTRAPOLATION TABLE FOR EFFECTIVENESS OF NEMATOCIDES ON VEGETABLES

► NEMATODES

INTRODUCTION

The table provides detailed lists of acceptable extrapolations, for the regulatory authority and applicants, in the context of the registration of plant protection products. The table should be used in conjunction with the crop safety extrapolations. It is important to ensure that expert judgment and regulatory experience are employed when using these tables.

The scope for extrapolation may be extended as data and experience with a certain plant protection product increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of target biology may be a relevant factor, either in extrapolating to other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure etc. should be considered.

TABLE FORMAT

The main pest species are listed in Column 1 (although this is not exhaustive), and the pest group to which they belong is specified in Column 2. Companies may choose if they wish to provide data only for individual named species, which would then appear individually listed on the label. But underlined species have been identified as key major targets and as such it is advisable to generate data on these. Furthermore, data on these species then allow a claim to be made for the whole pest group (as specified in Column 2), if required. If a claim for the whole pest group is required but there is no underlined species, then data must be generated on all listed species. Column 3 indicates the key indicator crop(s). In some instances this may be only one specified crop. In other cases, when separated by an 'or', the company may choose from a range of alternatives within the group. Data generated on crops in Column 3 may be used to extrapolate to all crops listed in Column 4.

NEMATODES		Crops	
1 Pest species	2 Pest group name	3 Indicator crops Data from any other relevant crop, if available, can support (reduced data) the indicator crop(s)	4 Extrapolation to other crops or crop groups
Any relevant species among: <i>Meloidogyne</i> sp. MELGSP (e.g. <i>M. hapla</i> MELGHA or <i>M. incognita</i> MELGIN, <i>M. chitwoodi</i> MELGCH, <i>M. fallax</i> MELGFA, <i>M. arenaria</i> MELGAR, <i>M. javanica</i> MELGJA)	Root knot nematodes (indoor)	Tomato LYPES, <i>Phaseolus vulgaris</i> PHSVX or Spinach, BEAVV or Cucumber CUMSA, or Melon CUMME	All other relevant indoor vegetables
Any relevant species among: <i>Meloidogyne</i> sp. MELGSP (e.g. <i>M. hapla</i> MELGHA or <i>M. incognita</i> MELGIN, <i>M. chitwoodi</i> MELGCH, <i>M. fallax</i> MELGFA, <i>M. arenaria</i> MELGAR, <i>M. javanica</i> MELGJA)	Root knot nematodes (outdoor)	<i>Phaseolus vulgaris</i> PHSVX or Spinach, BEAVV or Carrot or Potatoes or Tomatoes	All other relevant outdoor vegetables
<i>Pratylenchus penetrans</i> PRATPE	Root lesion nematodes	Potato SOLTU or Carrot DAUCS	All other vegetables
Any relevant species among: <i>Trichodoridae</i> spp. 1TRIHF <i>Pratylenchus</i> spp. 1PARAG <i>Rotylenchus</i> spp. 1ROTLG	Free living (Ectoparasitic) nematodes	Carrot DAUCS or Onion ALLCE or Leek or Potatoes SOLTU	All other vegetables
<i>Globodera rostochiensis</i> HETDRO or <i>G. pallida</i> HETDPA	Cyst nematodes	Potato SOLTU Tomato LYPES	All other relevant vegetables
<i>Heterodera carotae</i>	Cyst nematodes	Carrot DAUCS	All other relevant vegetables
<i>Ditylenchus dipsaci</i> DITYDI	Stem and bulb nematodes	Onion ALLCE or Field bean VICFX or Garlic ALLSA or Alfalfa MEDSA or Carrot DAUCS	Any other relevant vegetables

Relevant* All vegetables attacked by respective species of nematodes

B. CEREALS

Extrapolation Tables For Efficacy Of Pest Control Products

INTRODUCTION

The table provides detailed lists of acceptable extrapolations organized by crop groups, for the regulatory authority and applicants, in the context of the registration of pest control products. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. The tables should be used in conjunction with the above guidelines.

The scope for extrapolation may be extended as data and experience with a certain plant protection products increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of biology of the target pest may be a relevant factor, either in extrapolating to other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure among others should be considered.

TABLE FORMAT

The main pest species for the crop group are listed in Column 1 (although this is not exhaustive), and the pest group to which they belong is specified in Column 2. Companies may choose if they wish to provide data only for individual named species, which would then appear individually listed on the label. But underlined species have been identified as key major targets and as such it is advisable to generate data on these. Furthermore, data on these species then allow a claim to be made for the whole pest group (as specified in Column 2), if required. If a claim for the whole pest group is required but there is no underlined species, then data must be generated on all listed species.

Column 3 indicates the key indicator crop(s) for the crop group. In some instances this may be only one specified crop. In other cases, when separated by an 'or', the company may choose from a range of alternatives within the group. Data generated on crops in Column 3 may be used to extrapolate to all crops listed in Column 4. However, it is preferable to have data on several of the crops within the crop group, but data on the indicator crop should be available.

Column 5 identifies whether data on other crops against the same target may help to reduce the amount of required data on the indicator crop. It may be possible for a direct extrapolation without the need for further data on the indicator crop (marked with an asterisk (*)). However, this is dependent on the extent of available data and similarity of crop/target biology. The company should provide an appropriate reasoned case when wanting to use supporting data from other crop groups.

Column 6 gives examples of acceptable extrapolations for a particular pest claim onto other crops. This is not a comprehensive list. Whether extrapolation may be direct (no data, marked with an asterisk (*)), or require additional supporting data on the other crop, will again be dependent on the extent and relevance of the existing database and companies should provide an appropriate reasoned case.

Extrapolation regarding protected/outdoor situations

Please note that where crops may be grown in both protected and field situations, and where significant differences are expected in pest relevance or crop agronomy between indoor and outdoor situations, it is important to generate a proportion of the data on crops grown in both situations to ensure the product has been tested under a suitable range of typical and challenging conditions.

EFFECTIVENESS OF PEST CONTROL PRODUCTS IN CEREALS

Barley, Maize, Rice, Oat, Rye, Sorghum, Wheat, Millet, Popcorn, Baby corn and Sweet corn

TABLE 1: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF HERBICIDES

Weed		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Oxalis latifolia</i> L. <i>Oxygonium sinuatum</i> Hochst <i>Erucastrum arabicum</i> Fisch. & C.A. Mey. <i>Amaranthus hybridus</i> L. <i>Nicandra physalodes</i> L. <i>Datura stramonium</i> L. <i>Bidens pilosa</i> L. <i>Commelina benghalensis</i> L. <i>Tagetes minuta</i> L.	Broad leaf weeds	Maize	Sorghum Popcorn Sweet corn Baby corn	Other similar growing crops (Pigeon pea, Sunflower, sugarcane-plant crop)	Other similar growing crops (Pigeon pea, Sunflower, sugarcane-plant crop)

<i>Euphorbia esula</i> L. <i>Emex spinosus</i> L. <i>Tagetes patula</i> L. <i>Galinsoga parviflora</i> L. <i>Striga hermonthica</i> De Benth					
<i>Avena fatua</i> L. <i>Eleusine indica</i> L. <i>Setaria verticillata</i> (L.) P. Beauv <i>Digitaria scalarum</i> (Schweinf.) Chiov.	Grasses				
<i>Cyperus species</i>	Sedges				
<i>Polygonum convolvulus</i> <i>Bidens pilosa</i>	Broad leaf weeds	Wheat or Barley	Barley Oats		

<i>Nicandra physalodes</i> <i>Gallium spurium</i> <i>Oxygonum sinucutum</i> <i>Galinsonga paviflora</i> <i>Polygonum aviculare</i> <i>Chenopodium album</i> <i>Capsela bursa pastoris</i> <i>Physalis ixorcarpa</i> <i>Malva verticilatta</i> <i>Tagetes minuta</i> <i>Solanum nigrum</i> <i>Amaranthus hybridus</i> <i>Brassica napus</i> <i>Brassica campestris</i> <i>Raphanus raphanistrum</i>			Rye Upland rice Millet Triticale wheat		
<i>Bromus sterilis</i> <i>Setaria verticilatta.</i> <i>Setaria pumila</i> <i>Avena fatua</i> <i>Eleusine indica</i>	Grasses		Barley Oats Rye Upland rice		Pseudocereals

<i>Cynodon</i> spp.			Millet Triticale		
<i>Cyperus</i> species	Sedges		Barley Oats Rye Upland rice Millet Triticale		
<i>Ludwigia adscendens</i> <i>Monochoria vaginalis</i> <i>Ludwigia octavalis</i> <i>Ammania coccinea</i> <i>Commelina diffusa</i> <i>Marsilea minuta</i> <i>Spharanthus cyakuloides</i> <i>Alternanthera sessilis</i> <i>Sphaeranthus africanus</i> <i>Eclipta prostrata</i>	Broad leaf weeds	Paddy rice**			Arrow root Taro
<i>Leptochloa chinensis</i>	Grasses	Paddy rice**			Arrow root

<i>Echinochloa colona</i>					Taro
<i>Leersia hexandra</i>					
<i>Echinochloa crusgalli</i>					
<i>Cyperus difformis</i>	Sedges				Arrow root
<i>Bolboschoenus maritimus</i>					Taro
<i>Cyperus rotundus</i>					

Note: spp. represents more than one species in that genus

*Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).

**Weed species are specific to paddy rice and cannot be extrapolated to upland rice or any other cereals.

TABLE 2: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF INSECTICIDES AND AVICIDES

Pest		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Spodoptera exempta</i>	African armyworm	Maize	Sweet corn Sorghum Baby corns Rice	Sugarcane Cotton Soybeans Groundnuts Peanuts Tobacco	
<i>Spodoptera frugiperda</i>	Fall armyworm	Maize	Sweet corn Sorghum Baby corns Rice	Sugarcane Cotton Soybeans Groundnuts Peanuts Tobacco	

<i>Busseola fusca</i> <i>Chilo</i> spp.	Stem borer/ Stalk borer	Maize	Sweet corn Baby corns Sorghum Rice	Sugarcane	
<i>Rhopalosiphum maidis</i>	Aphids	Sweet corn/Maize	Popcorns Sorghum Baby corn Sweet corn Maize	Sugarcane <i>Phaseolus</i> spp. <i>Pisum</i> spp. Solanaceae	
<i>Macrotermes</i> spp. <i>Coptotermes</i> spp. <i>Odontotermes</i> spp..	Termites	Maize	Sweet corn Popcorns Baby corns Upland rice Sorghum	Sugarcane Pigeon peas Cotton Groundnuts Tobacco Beans	
<i>Cicadulina mbila</i>	Leaf hoppers	Maize	Sweet corn Popcorns Baby corns Rice	Sugarcane	

<i>Frankliniella</i> spp.	Thrips	Maize	Sweet corn Popcorns Baby corns	Pigeon peas Cotton	
<i>Heliothis</i> (<i>Helicoverpa</i>) <i>armigera</i>	African bollworm	Maize	Sorghum Sweet corn Popcorns Baby corns	Tobacco Cotton	
<i>Agrotis</i> spp.	Cut worms	Maize	Sweet corn Popcorns Baby corns Sorghum	Amaranth Pigeon pea	
<i>Spodoptera exempta</i>	African armyworm	Wheat	Barley Oats Rye Rice Millet Triticale	Sugarcane	Pseudocereals
<i>Spodoptera frugiperda</i>	Fall armyworm	Wheat	Barley Oats	Sugarcane	Pseudocereals

			Rye Rice Millet Triticale		
<i>Diuraphis noxia</i>	Russian wheat Aphids	Wheat	Barley Oats Rye Upland rice Millet Triticale		
<i>Rhopalosiphum padi</i> ; <i>R. maidis</i> ; <i>Metopolophium dirhodum</i>	Other aphids	wheat	Barley Oats Rye Upland rice Millet Triticale		
<i>Agrotis</i> spp.	Cut worms	Wheat	Barley Oats Rye	Tobacco Cotton	Pseudocereals

			Upland rice Millet Triticale		
<i>Haplothrips</i> spp. <i>Megalurothrips sjostedti</i> <i>Frankliniella</i> spp.	Thrips	Wheat	Barley Oats Rye Upland rice Millet Triticale	Pigeon pea Cowpea Cotton	Pseudocereals
<i>Petrobia latens</i>	Mites	Wheat	Barley Oats Rye Triticale Rice		Pseudocereals
<i>Heliothis (Helicoverpa) armigera</i>	African bollworm	Wheat	Oat Barley Triticale	Tobacco Cotton Sunflower	
<i>Nezara viridula</i>	Green stink Bugs	Wheat	Rice	Soybean	

			Barley	Pepper Beans	
<i>Quelea quelea</i>	Weaver birds	Wheat/Sorghum	Barley Rye Millet Wheat Sorghum Oat Rice Triticale	Sunflower	Sunflower

Note: For seed treatment extrapolation refer to table 4; spp. represents more than one species in that genus

***Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).**

TABLE 3: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF INSECTICIDE FOR STORAGE PESTS

Pest		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Prostephanus truncates</i> <i>Sitophilus spp.</i> <i>Rhyzopertha dominica</i> <i>Sitotroga cerealella</i> <i>Tribolium castaneum</i>	Storage pests	Wheat	Rye Oats Barley Millet Rice	Cassava Yams	Pseudocereals
<i>Prostephanus truncates</i> <i>Tribolium castaneum</i> <i>Sitophilus spp.</i> <i>Rhyzopertha dominica</i> <i>Sitotroga cerealella</i>	Storage pests	Maize	Popcorn Sorghum Sweet corn	Cassava Yams	

Note: spp. represents more than one species in that genus

***Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).**

TABLE 4: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF PEST CONTROL PRODUCTS FOR SEED TREATMENT

Pest		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Macrotermes</i> spp. <i>Coptotermes</i> spp. <i>Odontotermes</i> spp.	Termites	Wheat	Rye Oats Barley Millet Rice	Cotton	Pseudocereals
<i>Agrotis</i> spp.	Cut worms	Wheat	Rye Oats Barley Millet Rice	Tomatoes Kales Cotton Beans Cabbages	Pseudocereals
<u><i>Schizonycha</i> spp.</u>	<u>Chafer grubs**</u>	Wheat	Rye	Tomatoes	Pseudocereals

<i>Aeolus</i> spp.	Wire worm		Oats Barley Millet Rice	Carrots beans Peas Cucurbits	
<i>Macrotermes</i> spp. <i>Coptotermes</i> spp. <i>Odontotermes</i> spp	Termites	Maize	Popcorn Sorghum Sweet corn	Cotton	
<i>Agrotis</i> spp.	Cut worms	Maize	Popcorn Sorghum Sweet corn	Tomatoes Kales Cotton Beans Cabbages	
<u><i>Schizonycha</i> spp.</u> or <u><i>Hereronychus arator</i></u> <i>Aeolus</i> spp.	<u>Chafer grubs or</u> <u>African black</u> <u>beetles**</u> Wire worms	Maize	Popcorn Sorghum Sweet corn	Peas Tomatoes Carrots beans Peas Cucurbits	
<i>Atherigona soccata</i>	shootfly	Sorghum	Barley		
<i>Pythium</i> spp.	root rots	Wheat	Oats	Leafy vegetables	Pseudocereals

<i>Rhizoctonia</i> spp.			Rye	Carrots	
<i>Fusarium</i> spp.			Barley	Cucurbits	
				<i>Allium</i> spp.	
<i>Pythium</i> spp.	Stalk rot	Maize/baby corn	Popcorn		
<i>Fusarium</i> spp.			Maize		
<i>Anthraco</i> spp.			Sweet corn		
<i>Botryodiplodia</i> spp.			Baby corn		

Note: spp. represents more than one species in that genus

*Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).

** Data on chafer grub or African black beetles can be extrapolated to wire worm

TABLE 5: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF FUNGICIDES

Pest		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Puccinia graminis</i>	Stem rust	Wheat	Barley Triticale Rye		
<i>Puccinia striiformis</i> <i>Puccinia triticina</i> <i>Puccinia hordei</i> <i>Puccinia recondita</i>	Yellow rust Leaf rust	Wheat	Barley Rye Triticale		
<i>Ustilago nuda</i>	Loose smut	Wheat	Barley		
<i>Fusarium graminearum</i>	Fusarium head blight/Scab	Wheat	Barley Rye		
<i>Septoria tritici</i> <i>Septoria nodorum</i>	Septoria leaf spots/blotch	Wheat	Barley		

			Oats		
<i>Parastagonospora nodorum</i>	Glume blotch	Wheat	Triticale Barley		
Barley yellow dwarf virus	Barley yellow dwarf disease	Wheat	Barley Oats Triticale Rice Rye	Maize	Pseudocereals
<i>Erysiphe graminis</i>	Powdery mildew	Wheat	Barley		
<i>Microdochium oryzae</i>	Scald	Wheat	Rice Barley Rye		
<i>Pyrenophora teres</i>	Net blotch	Barley	Wheat Oats		
<i>Physoderma maydis</i>	Brown spot	Maize/baby corn	Popcorn Maize Sweet corn		

			Baby corn		
<i>Cercospora zeae</i> <i>Leptosphaeria</i> spp. <i>Curvularia</i> spp.	leaf spots	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Ustilago maydis</i> <i>Sphacelotheca reiliana</i>	Smut	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Puccinia sorghi</i> <i>Puccinia polysora</i> <i>Physopella zeae</i>	Rusts	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Exsehilum turcicum</i>	Northern leaf blight	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Helminthosporium maydis</i>	Southern leaf blight	Maize/baby corn	Popcorn Maize		

			Sweet corn Baby corn		
<i>Maize chlorotic mottle virus</i> <i>Sugarcane mosaic virus</i>	Maize lethal necrosis disease* (aphids, thrips, beetles and rootworms as vectors)	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
Maize streak Virus	Maize streak disease* (leafhoppers as vectors)	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Peronosclerospora</i> spp. <i>Sclerophthora</i> spp.	Downy mildew	Maize/baby corn	Popcorn Maize Sweet corn Baby corn Sorghum	Sugarcane	
<i>Aspergillus</i> spp. <i>Penicilium</i> spp. <i>Gibberella</i> spp. <i>Diplodia</i> spp.	Ear rots	Maize/baby corn	Popcorn Maize Sweet corn Baby corn	Cotton Groundnuts	

<i>Fusarium</i> spp					
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Note: spp. represents more than one species in that genus; Control of viral diseases the focus will be on the vectors

*Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).

TABLE 6: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF NEMATICIDES

Pest		Crop: within cereals		
1	2	3	4	5
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)
<i>Pratylenchus</i> spp.	Lesion nematodes	Wheat or maize	Barley Rye Oats Sorghum Rice Wheat Maize	Bananas
<i>Meloidogyne</i> spp.	Root knot nematodes	Wheat or maize	Barley Rice Rye Sorghum Oats	Tomatoes Spinach Beans Night shade

			Wheat Maize	
<i>Anguina tritici</i>	Ear cockle of wheat	Wheat	Rye Triticale	

Note: spp. represents more than one species in that genus

***Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).**

A. CROP SAFETY

EXTRAPOLATION TABLES FOR CROP SAFETY: FUNGICIDES, HERBICIDE AND INSECTICIDES IN CEREALS

The extrapolation tables should be used in conjunction with efficacy extrapolation guidelines. The tables provide detailed lists of acceptable extrapolations organized by crop groups for the regulatory authority and applicants in the context of the registration of plant protection products for minor uses. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. The regulatory authority excludes liability as to the reliability of the information provided through these tables.

For seed treatments, indicator crops should include seeds of similar or smaller size. Specific trials with insecticides and fungicides are not essential for foliar treatment. Observations in efficacy or residue trials are usually acceptable. For seed treatment a germination study on the indicator crop is usually necessary.

TABLE 7: EXTRAPOLATION TABLE FOR CROP SAFETY OF HERBICIDES

Treatment type		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Treatment type	Herbicide group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Pre-emergence	Broad leaf weed herbicides	Baby corn and maize	Popcorn Sweet corn Maize Baby corn		
Post-emergence					
Pre-emergence	Broad leaf weed herbicides	Wheat and Barley	Oats Rye Upland rice Millet Triticale		
Post-emergence					

Note: Extrapolation for graminicides and sedges is not possible.

For sorghum, specific studies for post-emergence and pre-emergence herbicides are required.

Extrapolation is applicable within the same method of application only (Pre- or post- emergence application).

TABLE 8: EXTRAPOLATION TABLE FOR CROP SAFETY OF FUNGICIDES AND INSECTICIDES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Baby corn or Maize	Popcorns		
Soil treatment		Sweet corn		
Foliar treatment		Baby corn Maize Sorghum		
Seed treatment	Wheat or barley	Oats		
Soil treatment		Wheat		
Foliar treatment	Wheat and barley	Barley Rye Triticale		

C. HERBS AND SPICES

Efficacy and Crop Safety guidelines

Indicator pests and representative commodities for extrapolation of efficacy data in herbs and spices commodity group

Representative commodities within herb or spices group were selected based on principles of data extrapolation in the EPPO guidelines. Recognizing that herbs and spices are minor crops, major vegetable groups with some similarities to herbs and spices were identified as indicator crops. Pests and diseases were also identified in the indicator crops as representative species for the efficacy trials. Data generated for the identified vegetables/pest combination can be used for extrapolation to various herbs and spices in column 6 in the vegetable extrapolation tables for vegetables. For details, refer to the extrapolation tables.

Herbs and spices may have different growth habit, canopy sizes and GAPs from the representative indicator crops in the efficacy tables. In order to ensure adequate coverage of the crop with the pesticide during application and to reduce incidences of residues, applicants are advised to carry out calibrations for the various herbs and spices to establish appropriate spray volumes per hectare. This information will be used together with the dosage established through efficacy trials on the representative crop and species for extrapolation.

Indicator pests and representative commodities for extrapolation of crop safety data in herbs and spices commodity group (herbicides, fungicides, insecticides, seed treatment, etc.)

Phytotoxicity is particularly relevant to certain products such as herbicides, some types of applications and for specific crops. It can vary considerably between different crop species, cultivars of the same crop, and between different plant protection products. Crop safety extrapolation is possible in some situations, but should be well reasoned in extrapolating from vegetables to herbs. Extrapolation may not be possible where use of the product has resulted in crop damage on some crops or cultivars where the crops concerned are significantly different, or when a crop is known to be particularly sensitive. The following principles are important to consider;

1. Method of application should be similar.
2. Availability and interpretation of evidence of crop safety.
3. Taxonomic relationship and similarity in morphology.
4. Availability of adequate crop safety data showing a good margin of safety in vegetables for extrapolation to herbs and spices.

N/B: For details on crop safety extrapolation for fungicides, herbicides, insecticides, etc, refer to the extrapolation tables for vegetables.

D. FRUITS AND TREE NUTS

INTRODUCTION

The table provides detailed lists of acceptable extrapolations organized by crop groups, for regulatory authorities and applicants, in the context of the registration of pest control products. The table should be used in conjunction with the above guidelines. It is important to ensure that expert judgment and regulatory experience are employed when using these tables.

The scope for extrapolation may be extended as data and experience with a certain plant protection products increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of biology of the target may be a relevant factor, either in extrapolating to the other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure etc. should be considered.

TABLE FORMAT

The main pest species for the crop group are listed in Column 1 (although this is not exhaustive), and the pest group to which they belong is specified in Column 2. Companies may choose if they wish to provide data only for individual named species, which would then appear individually listed on the label. But underlined species have been identified as key major targets and as such it is advisable to generate data on these. Furthermore, data on these species then allow a claim to be made for the whole pest group (as specified in Column 2), if required. If a claim for the whole pest group is required but there is no underlined species, then data must be generated on all listed species.

Column 3 indicates the key indicator crop(s) for the crop group. In some instances this may be only one specified crop. In other cases, when separated by an 'or', the company may choose from a range of alternatives within the group. Data generated on crops in Column 3 may be used to extrapolate to all crops listed in Column 4. However, it is preferable to have data on several of the crops within the crop group, but data on the indicator crop should be available.

Column 5 identifies whether data on other crops against the same target may help to reduce the amount of required data on the indicator crop. It may be possible for a direct extrapolation without the need for further data on the indicator crop (marked with an asterisk (*)).

However, this is dependent on the extent of available data and similarity of crop/target biology. The company should provide an appropriate reasoned case when wanting to use supporting data from other crop groups.

Column 6 gives examples of acceptable extrapolations for a particular pest claim onto other crops. This is not a comprehensive list. Whether extrapolation may be direct (no data, marked with an asterisk (*)), or require additional supporting data on the other crop, will again be dependent on the extent and relevance of the existing database and companies should provide an appropriate reasoned case.

a. EXTRAPOLATION TABLE for EFFECTIVENESS of FUNGICIDES

Table 1. DISEASES ON TROPICAL AND SUBTROPICAL FRUITS (EDIBLE PEEL)

Figs *Ficus carica* FIUCA, Table olives *Olea europaea* OLVEU, Carambolas *Averrhoa carambola* AVRCA, Kaki *Diospyros kaki* DOSKA, Jamblus *Syzygium cumini* SYZCU, Guava *Psidium guajava*, Date palm *Phoenix dactylifera* L.

Diseases		Crops: within Tropical and subtropical fruits (Edible Peel)		Crops: outside Tropical and subtropical fruits (Edible Peel)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Cycloconium oleaginum</i> (= <i>Spilocaea</i> <i>oleaginae</i>) CYCLOL	Olive peacock spot	Olive OLVEU			
<i>Pseudomonas savastanoi</i> pv. <i>savastanoi</i> PSDMSA	Olive knot	Olive OLVEU			Oleander (NEROL), Jasmine tree (HRHPU) Fraxinus (FRXSS)

Diseases		Crops: within Tropical and subtropical fruits (Edible Peel)		Crops: outside Tropical and subtropical fruits (Edible Peel)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Glomerella cingulata</i> (=Colletotrichum gloeosporioides) GLOMCI, <i>G. acutata</i> (=Colletotrichum acutatum) COLLAC, <i>Colletotrichum clavatum</i> COLLCL	Anthracnose	Olive OLVEU or Guava or Fig	Any relevant Tropical and subtropical fruits (Edible Peel)		
<i>Pseudocercospora</i> <i>cladosporioides</i>	Leaf spot		Any relevant Tropical and subtropical fruits (Edible Peel)		

Diseases		Crops: within Tropical and subtropical fruits (Edible Peel)		Crops: outside Tropical and subtropical fruits (Edible Peel)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
CERCCL		Olive OLVEU or Guava or Fig			
<i>Alternaria sp.</i> ALTESP	Alternaria rot	Fig FIUCA		Apple MABSS	
<i>Cerotelium fici</i> KUEHFI	Rust of fig	Fig FIUCA		Peach PRNPS, Plums PRNDO	
<i>Verticillium dahliae</i> VERTDA	Verticillium wilt	Olive OLVEU		Peach PRNPS, Plums PRNDO	
<i>Phytophthora cinnamomi</i>	Dieback	Fig FIUCA or Guava	Any relevant Tropical and subtropical fruits (Edible Peel)		

Diseases		Crops: within Tropical and subtropical fruits (Edible Peel)		Crops: outside Tropical and subtropical fruits (Edible Peel)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Armillaria mellea</i>	Armillaria root rot	Fig FIUCA or Guava	Any relevant Tropical and subtropical fruits (Edible Peel)		
<i>Phomopsis cinerascens</i>	Canker	Fig FIUCA or Guava	Any relevant Tropical and subtropical fruits (Edible Peel)		

Table 2; DISEASES ON TROPICAL AND SUBTROPICAL FRUITS (INEDIBLE PEEL, LARGE)

Avocado *Persea americana* PEBAM, Banana *Musa acuminata* MUBAC *Musa balbisiana* MUBBA, Mango *Mangifera indica* MNGIN, Papaya *Carica papaya* CIAPA, Pomegrenate *Punica granatum* PUNGR, Cherimoyas *Annona cherimola* ANUCH, Guavas *Psidium guajava* PSIGU, Pineapple *Ananas comosus* ANHCO, Breadfruit *Artocarpus altilis* ABFAL, Durian *Durio zibethinus* DURZI, Soursops *Annona muricata* ANUMU *Annona sp.* ANUSS

Disease s		Crops: within Tropical and subtropical fruits (Inedible Peel Large)		Crops: outside tropical and subtropical Fruit (Inedible Peel Large)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Oidium sp.</i> ODISP	Powdery mildew	Avocado PEBAM or Papaya CIAPA or Mango MNGIN	Avocado PEBAM Papaya CIAPA, Mango MNGIN	Peach PRNPS	All relevant crops affected by these pests
<i>Colletotrichum sp.</i> COLLSP,	Anthracnose	Avocado PEBAM or Mango MNGIN or Guava PSISS or Papaya CIAPA or <i>Annona sp.</i> ANUSS or Banana MUBSS	<i>Annona sp.</i> ANUSS, Avocado PEBAM, Mango MNGIN, Guava PSISS, Papaya CIAPA, Banana MUBSS	Litchi LIHCH, Passion fruit PAQSS	
<i>Rosellinia necatrix</i> ROSLNE	White root rot	Avocado PEBAM or Mango MNGIN	Avocado PEBAM, Mango MNGIN	Apple MABSS	

Disease s		Crops: within Tropical and subtropical fruits (Inedible Peel Large)		Crops: outside tropical and subtropical Fruit (Inedible Peel Large)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Mycosphaerella musicola</i> (= <i>Cercospora musae</i>) MYCOMU, <i>Mycosphaerella fijensis</i> MYCOFI	Sigatoka	Banana MUBSS			All relevant crops affected by these pests
<i>Colletotrichum</i> sp., COLLSP, <i>Fusarium</i> sp. FUSASP, <i>Aspergillus</i> sp. ASPESP	Postharvest diseases	Banana MUBSS or Avocado PEBAM or Mango MNGIN	Papaya CIAPA, Mango MNGIN, Avocado PEBAM	Apple MABSS, Passionfruit PAQSS	
<i>Botryosphaeria rhodina</i> (= <i>Botryodiplodia theobromae</i>) PHYORH		Papaya CIAPA or Banana MUBSS or Avocado PEBAM or Mango MNGIN	Papaya CIAPA, Banana MUBSS, Avocado PEBAM, Mango MNGIN	Passion fruit PAQSS	
<i>Coniella granati</i> <i>Phomopsis fukushii</i> <i>Pytophthora citricola</i> <i>Botryosphaeria</i> spp.	Cankers	Pomegranate PUNGR or avocado or mango	All relevant tropical and subtropical fruits with inedible peel Large	Sweet almond PRNDU, Common hazelnut CYLAV	
<i>Ascochyta</i> sp. ASCOSP	Aschochyta leafspot	Avocado PEBAM or Mango MNGIN or Guava PSISS or	<i>Annona</i> sp. ANUSS, Avocado PEBAM, Mango MNGIN, Guava PSISS, Papaya CIAPA, Banana MUBSS		

Disease s		Crops: within Tropical and subtropical fruits (Inedible Peel Large)		Crops: outside tropical and subtropical Fruit (Inedible Peel Large)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
		Papaya CIAPA or <i>Annona sp.</i> ANUSS or Banana MUBSS			
<i>Phytophthora sp.</i> PHYTSP	Phytophthora disease	<i>Annona sp.</i> ANUSS Avocado PEBAM, Papaya CIAPA, Pineapple ANHCO, Guava PSISS	<i>Annona sp.</i> ANUSS Papaya CIAPA, Pineapple ANHCO Guava PSISS	Citrus CIDSS, Apple MABSS, Passion fruit PAQSS Apricot, Plum	Passion fruit PAQSS
		Pomegranat ePUNGR		Pome fruit	
<i>Phomopsis sp.</i> PHOPSP <i>Phoma sp.</i> PHOMSP	Moulds	<i>Annona sp.</i> ANUSS or Guava PSISS	<i>Annona sp.</i> ANUSS, Guava		
		Pomegranat ePUNGR		Grapevine VITVI	
<i>Aspergillus niger</i> <i>Alternaria alternata</i> <i>Penicillium sp.</i> PENISP	Fruit rot	Pomegranat ePUNGR		Pome fruit Grapevine VITVI	
<i>Elsinoë mangiferae</i> <i>Sphaceloma perseae</i>	Scab	Avocado PEBAM, Mango	Avocado PEBAM, Mango MNGIN		

Disease s		Crops: within Tropical and subtropical fruits (Inedible Peel Large)		Crops: outside tropical and subtropical Fruit (Inedible Peel Large)	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
		MNGIN			
<i>Xanthomonas sp.</i> XANTSP	Bacterium disease	Mango MNGIN	All relevant tropical and subtropical fruits with inedible peel large	Peach PRNPS	
<i>Pseudomonas syringae</i> PSDMSX	Bacterial apical necrosis	Mango MNGIN, avocado		Peach PRNPS, Pear PYUCO	Peach PRNPS, Pear PYUCO
<i>Erwinia chrysanthemi</i> ERWICH	Bacterium disease	Pineapple ANHCO Papaya CIAPA	Papaya CIAPA Pineapple ANHCO	Peach PRNPS, Apple MABSD,	

Table 3. DISEASES ON TROPICAL AND SUBTROPICAL FRUITS (INEDIBLE PEEL, SMALL)

Kiwi *Actinidia deliciosa* ATIDE and *Actinidia chinensis* ATICH, Litchis *Litchi chinensis* LIHCH, Passionfruit *Passiflora edulis* PAQED, Prickypears *Opuntia ficus-indica* OPUFI, Star apples *Chrysophyllum cainito* CSFCA, American persimons *Diospyros virginiana* DOSVI

Disease s		Crops: within Tropical and subtropical Fruit (Inedible Peel, small)		Crops: outside Tropical and subtropical Fruit (Inedible Peel, small)	
1 Pathogen species	2 Pathogen group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Phaeomoniella chlamydospora</i> PHMOCH, <i>Togninia minima</i> (= <i>Phaeoacremonium aleophilum</i>) TOGNMI	Wood disease	Kiwi fruit ATIDE	All relevant tropical and subtropical fruits inedible peel small	Grapevine VITVI	
<i>Phomopsis actinidiae</i> PHOPAC	Canker			Grapevine VITVI	
<i>Armillaria mellea</i> ARMIME	Root rot			Stone fruit, Pome fruit, Grapes VITVI	Perennial crops
<i>Colletotrichum</i> sp. COLLSP <i>Colletotrichum gloeosporioides</i> GLOMCI	Anthracnose	Litchi LIHCH or Passion fruit PAQSS	Litchi LIHCH, Passion fruit PAQSS	Avocado PEBAM, Mango MNGIN, Banana MUBSS, Annonaceae ANUSS, Guava PSISS	Annonaceae ANUSS, Guava PSISS, Passion fruit PAQSS

Table 4. DISEASES ON CURRANTS AND BERRIES

Cowberry *Vaccinium vitis-idaea* VACVI, Cranberry *Vaccinium macrocarpon* VACMA, Bilberry *Vaccinium myrtillus* VACMY, Mossberry *Vaccinium oxycoccos* VACOX, Blueberry *Vaccinium corymbosum* VACCO, Blackberry *Rubus fruticosus* RUBFR, Burbank's thornless blackberry *Rubus ulmifolius* RUBUL, Raspberry *Rubus idaeus* RUBID, Tayberry *Rubus Tayberry hybrids* RUBTY, Boysenberry, Loganberry, Veitchberry *Rubus x loganobaccus* RUBLO, Black currant *Ribes nigrum* RIBNI, Red and white currants *Ribes rubrum* RIBRU, Gooseberry *Ribes uva-crispa* RIBUC, Mulberry *Morus indica*, Grapes *Vitis spp* VITVI

VTSS

Pest		Crop: currants and berries		Crops: outside currants and berries	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u><i>Drepanopeziza ribis</i></u> (= <i>Gloeosporidiella ribis</i>) DREPRI, <i>Blumeriella hiemalis</i> BLUMJA <i>Elsinoe ampelina</i>	Anthracnose	Black berry	Blackcurrant RIBSS Raspberry RUBID, Grapes		Cherry PRNAV, Pears PYUCO, Strawberry FRAAN
<i>Glomerella acutata</i> (= <i>Colletotrichum acutatum</i>) COLLAC	Anthracnose	Raspberry or Cranberry	Wineberry RUBSS and Cranberry VACSS	Strawberry FRAAN, Sweet Cherry PRNAV, Sour Cherry PRNCE	Cherry PRNAV, Elderberry SAMNI

Pest		Crop: currants and berries		Crops: outside currants and berries	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Botryotinia fuckeliana</i> BOTRCI <i>Botrytis Cinerea</i>	Grey mould (botrytis)	Black berry RIBSS or Raspberry RUBID or Blue berry VACCO, Grapes	Raspberry RUBSS, Cranberry. VACSS, grapes, black berry, blue berry	Strawberry* FRAAN	Rose hip ROSSS Other cane and bushfruit
<u><i>Leptosphaeria coniothyrium</i></u> LEPTCO	Cane blight	Blackberry RUBUL or Raspberry RUBID or <i>Ribes</i> sp RIBSS	Wine berry. RUBSS, Black currant sp RIBSS, Cranberry VACSS		
<u><i>Mycosphaerella</i> sp.</u> MYCOSP, <i>Sphaerularia rubi</i> (= <i>Septoria rubi</i>) SPHNRU, <i>Elsinoe veneta</i> ELSIVE <i>Mycosphaerella ribis</i> MYCORI	Leaf spot disease Anthracnose	Black currants RIBSS or mulberry	Raspberry RUBSS, Black currants, Mulberry	Strawberry FRAAN	
<i>Alternaria</i> sp ALTESP	Leaf spot disease	Black currants RIBSS	Raspberry RUBID, Black currants		Eldberry SAMNI

Pest		Crop: currants and berries		Crops: outside currants and berries	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Cercospora spp</i>	<i>Cercospora</i> Leaf Spot	Grapes			
<i>Sphaerotheca mors-uvae</i> SPHRMU or <i>Erysiphe necator</i> (= <i>Uncinula necator</i>) UNCINE <i>Phyllactinia corylea</i>	Powdery mildew	Gooseberry RIBUC or Raspberries RUBID or Mulberry	Raspberry RUBID, Black currant. RIBSS, Mulberry, grapes	Vitis* VITSS, Strawberry* FRAAN	Vitis VITSS
<i>Podosphaera aphanis</i> PODOAP, <i>Sphaerotheca mors-uvae</i> SPHRMU, <i>Erysiphe necator</i> (= <i>Uncinula necator</i>) UNCINE				Strawberry* FRAAN Apple MABSD	Vitis VITSS
<i>Sphaerotheca mors-uvae</i> SPHRMU, <i>Microsphaera grossulariae</i> MCRSGR, <i>Phyllactinia guttata</i> (= <i>P. suffulta</i>) PHYLGU	Powdery mildew	Blackcurrant RIBNI	Raspberry RUBID, Cranberry VACSS, Red Currant RIBRU		

Pest		Crop: currants and berries		Crops: outside currants and berries	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Podosphaera macularis</i> (= <i>Sphaerotheca macularis</i>)		Raspberry RUBID	Blackberry RUBUL and other Wineberry sp. RUBSS		
<i>Peronospora sparsa</i> PSPE SR <i>Plasmopara Viticola</i>	Downy mildew	Raspberries RUBID	Wineberry RUBSS, Grapes	Rose hip ROSSS	
<i>Didymella applanata</i> DIDYAP	Spur blight	Raspberry RUBID	Wineberry RUBSS, Black currant RIBSS, cranberry	Cucurbitaceae 1CUCF	
<i>Phomopsis</i> sp., PHOPSP, <i>Diaporthe vaccinii</i> DIAPVA, <i>Eutypa lata</i> EUTYLA,	Dieback,	Blackcurrant RIBSS or Raspberry	Cowberry VACVI, Bilberry VACMY, Red Currant RIBRU	Grapes VITSS, Apple MABSD	
	Twig blight	cranberry. VACSS			
<i>Cronartium ribicola</i> , CRONRI, <i>Puccinia ribesii-caricis</i> PUCCRC	Rust	Blackcurrant RIBNI	Wineberry RUBSS, Blackcurrant RIBSS, Cranberry VACSS	Plum PRNDO	Rose hip ROSSS
<i>Thekopsora</i> sp. THEKSP		cranberry. VACSS			

Pest		Crop: currants and berries		Crops: outside currants and berries	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Phragmidium rubei</i> PHRARU, <i>Phragmidium bulbosum</i> (=P.rubi) PHRABU, <i>Phragmidium violaceum</i> PHRAVI		Raspberry RUBID		Plum PRNDO	
<i>Phytophthora rubi</i> PHYTFU, <i>P. cinnamomi</i> PHYTCN, <i>Rhizoctonia spp</i>	Phytophthora root rot, foot rot	Raspberry RUBID or Cranberry sp. VACSS, Mulberry	Raspberry RUBSS, Blackcurrant, cranberry. VACSS, Mulberry, grapes	Strawberry* FRAAN (<i>P. cactorum</i> PHYTCC)	
<i>Thielaviopsis basicola</i> THIEBA	Black root rot	BlackBerry	Raspberry sp. RUBSS, Black currant sp RIBSS	Cherry PRNAV, Plum PRNDO, Solanaceae 1SOLF, Carrot DAUCA	
<i>Guignardia Bidwelli</i>	Black Rot	Grapes			
<i>Botryosphaeria sp.</i> BOTSSP, <i>Godronia cassandrae</i> GODRCA	Canker	Cranberry. VACSS		Woody ornamentals Solanaceae 1SOLF Tobacco NIOTA	

Pest		Crop: currants and berries		Crops: outside currants and berries	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Rhizopus spp</i> , <i>Aspergillus spp</i> , <i>Penicillium spp</i>	Black Mould Rot, Blue Mould Rot Of Berries	Grapes or raspberry or blueberry or mulberry	All relevant berries, currants and grapes		

Table 5. DISEASES ON STRAWBERRIES

FRASS *Fragaria* sp.

Pest s		Crops: within Strawberries		Crops: outside Strawberries	
1 Pathogen species species	2 Pest group name	3 Indicator crops	4 Extrapolation to othercrops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops(reduced or no data*)
<i>Glomerella acutata</i> COLLAC	Anthracnose	Strawberry FRASS		Pome and stonefruits, Fruiting vegetable of solanaceae	Pome and stone fruits
<i>Mycosphaerella fragariae</i> MYCOFR, <i>Diplocarpon earlianum</i> DIPCEA, <i>Gnomonia comari</i> (<i>Gnomonia fructicola</i> , <i>Zythia</i> sp.) GNOMFR	Leaf spot disease	Strawberry FRASS			
<i>Alternaria alternata</i> ALTEAL				Carrot DAUCA, Tomato LYPES	
<i>Ramularia</i> sp. RAMUSP, <i>Marssonina</i> sp MARSSP., <i>Alternaria</i> sp. ALTESP,					Tomato LYPES
<i>Thanatephorus cucumeris</i> RHIZSO, <i>Rhizoctonia</i> sp. RHIZSP and <i>R. fragariae</i> RHIZFR	Black root rot	Strawberry FRASS		Lettuce LACSA and other Leafy vegetables, Raddish RAPS R	Tomato LYPES

Pests		Crops: within Strawberries		Crops: outside Strawberries	
1 Pathogen species species	2 Pest group name	3 Indicator crops	4 Extrapolation to othercrops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops(reduced or no data*)
<u>Phytophthora fragariae</u> PHYTFR, <u>Phytophthora cactorum</u> PHYTCC	Phytophthora disease	Strawberry FRASS		Host crops infected by <i>Phytophthora cinnamomi</i> PHYTCN	Herbs Raspberry RUBID
<u>Leveillula taurica</u> LEVETA <u>Podosphaera aphanis</u> PODOAP <i>Sphaerotheca</i> sp. SPHRSP	Powdery mildew	Strawberry FRASS	Strawberry FRASSindoor	<i>Sphaerotheca amorsuvae</i> in Gooseberry* , ornamentals Fruiting vegetables of <i>Solanaceae</i>	Red currant and Whitecurrant RIBRU, Blackcurrant RIBNI, Blackberry RUBFR, Raspberry RUBID, Grape VITSS
<u>Botryotinia fuckeliana</u> BOTRCI (outdoor)	Grey mould	Strawberry FRASS	Strawberry FRASS		Peach* PRNPS, Plum*PRNDO, Cherry*, Currants*, Berries* (goose, blue, black, rasp and logan) Grapes* VITVI Herbs, Tomato LYPES, Fig FIUSS
<i>Verticillium</i> sp. VERTSP	Verticillium disease	Strawberry FRASS		Ornamentals	Ornamentals Tomato LYPES, Peas PIBSS
<i>Xanthomonas fragariae</i> XANTFR	Bacterium disease	Strawberry FRASS			

Pests		Crops: within Strawberries		Crops: outside Strawberries	
1 Pathogen species species	2 Pest group name	3 Indicator crops	4 Extrapolation to othercrops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops(reduced or no data*)
<i>Colletotrichum gloeosporioides Colletotrichum fragariae Phomopsis obscurans</i>	Crown rot	Strawberry FRASS			
	Leaf blight	Strawberry FRASS			

Table 6. DISEASES ON CITRUS FRUIT

CIDPA Grapefruit *Citrus paradisi*, CIDSI Orange *Citrus sinensis*, CIDLI Lemon *Citrus limon*, CIDAF Lime *Citrus aurantifolia*, CIDRE Mandarin *Citrus reticulata sensu stricto*, FOLMA and FOLJA Kumquats *Fortunella margarita*, *F. japonica*

Diseases		Crops: within Citrus Fruit		Crops: outside Citrus Fruit	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Glomerella cingulata</i> (=Colletotrichum gloeosporioides, Gloeosporium limetticola) GLOMCI	Anthracnose	Orange CIDSI or Mandarin CIDRE or Lemon CIDLI	Other relevant citrus fruit		Avocado PEBAM Papaya CIAPA Mango MNGIN
<i>Mycosphaerella</i> spp. MYCOSP	Leaf spot			Cherry PRNCE or Peach PRNPS or Persimmon DOSVI	Cherry PRNCE or Peach PRNPS or Persimmon DOSVI
<i>Plenodomus tracheiphilus</i> (=Phoma tracheiphila) DEUTTR	Dieback of citrus (Mal secco)				
<i>Elsinoe fawcetti</i> ELSIFA, <i>Elsinoe australis</i> ELSIAU	Scab				
<i>Phyllosticta citricarpa</i> (=Guignardia citricarpa) GUIGCI	Black spot				

Diseases		Crops: within Citrus Fruit		Crops: outside Citrus Fruit	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Pseudocercospora angolensis</i> CERCAN	Cercospora leaf and fruit spot	Orange CIDSI or Mandarin CIDRE or Lemon CIDLI	Other relevant citrus fruit		
<i>Glomerella acutata</i> (= <i>Colletotrichum acutatum</i>) COLLAC	Postbloom fruit disease			Olive OLVEU, Strawberry FRASS	Olive OLVEU, Strawberry FRASS
<i>Diapotheca citri</i> (= <i>Phomopsis citri</i>) DIAPCI	Melanose				
<i>Alternaria alternata</i> ALTEAL, <i>Alternaria alternata</i> f. sp. <i>citri</i> ALTEAC	Brown spot			Pomegranate PUNGR	Pomegranate PUNGR
<i>Phytophthora citricola</i> PHYTCI, <i>Phytophthora citrophthora</i> , PHYTCO, <i>Phytophthora nicotianae</i> var. <i>Parasitica</i> (= <i>Phytophthora parasitica</i>) PHYTNP	Phytophthora disease, Crown and root rot			Apple MABSS, Any stone fruit, Corossol ANUSS	Annonaceae ANUSS, Avocado PEBAM, Guava PSISS, Papaya CIAPA, Passion fruit PAQSS, Pineapple ANHCO, Any stone fruit, Guava PSISS

Diseases		Crops: within Citrus Fruit		Crops: outside Citrus Fruit	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Pseudomonas syringae</i> pv. <i>syringae</i> PSDMSY	Bacterium disease	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI	Other relevant citrus fruit	Peach PRNPS, Apricot PRNAR	
			Other relevant citrus fruit		
<i>Xanthomonas axonopodis</i> pv. <i>citri</i> (=X. <i>campestris</i> pv. <i>citri</i>) XANTCI	Canker	Oranges or lime			
<i>Botrytis cinerea</i>	Grey mould	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI Orange CIDSi, Mandarin CIDRE, Lemon CIDLI		
<i>Penicillium</i> sp.	Blue mould	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI		

Disease s		Crops: within Citrus Fruit		Crops: outside Citrus Fruit	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)

Table 7. DISEASES ON STONE FRUIT:

PRNPS peach *Prunus persica* including PRNPN nectarine *P. persica* var. *nucipersica* (and similar hybrids), PRNAR apricot *P. armeniaca*, PRNDU almond *P. dulcis*, PRNDO plum *P. domestica*, PRNDD damson plum *P. damascene*, PRNDS Mirabelle *P. domestica* var. *syriaca*, PRNDI greengage (reine-claude) *P. domestica* subsp. *italic*, PRNDT bullace *P. domestica* subsp. *insititia*, PRNSN sloe *P. spinosa*, PRNSC Japanese plum *P. salicina*, PRNAV sweet cherry *P. avium*, PRNCE sour cherry *P. cerasus*

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Podosphaera pannosa</i> SPHRPA or <i>Podosphaera</i> spp. PODOSP	Powdery mildew	Peach PRNPS or Cherry	Stone fruit	Pome fruit Roses	Avocado PEBAM, Mango MNGIN, Papaya CIAPA
<i>Venturia carpophila</i> VENTCA	Scab	Peach PRNPS or Almond	Stone fruit		
<i>Blumeriella jaapii</i> (= <i>Blumeriella hiemalis</i>)	Leaf spot	Peach or cherry	Stone fruit		

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no	Extrapolation to crops (reduced or no data*))
BLUMJA					
<i>Polystigma rubrum</i> POLTRU	Leaf spot	Peach or plums	Stone fruit		
<i>Apiognomonia erythrostoma</i> GNOMER	Leaf spot (or scorch)	Apricot PRNAR or Cherry	Apricot PRNAR, Cherry		
<i>Stigmina carpophila</i> (= <i>Wilsonomyces carpophilus</i>) STIGCA	Leaf spot (shot hole disease)	Cherry or Apricot PRNAR	Other relevant Stone fruits		Ornamental Prunus
<i>Mycosphaerella</i> spp. MYCOSP	Leaf spot	Cherry or Peach PRNPS	Cherry, Peach PRNPS, Nectarine PRNPN	Citrus (<i>M. citri</i> MYCOCI), Pear (<i>M. pyri</i> MYCOPY)	Citrus (<i>M. citri</i> MYCOCI), Pear

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no	Extrapolation to crops (reduced or no data*))
(mainly <i>M. cerasella</i> MYCOCE and <i>M. pruni-persicae</i> MYCOPE)					<i>M. pyri</i> MYCOPY)
<i>Taphrina</i> spp. TAPHSP (mainly <i>T. deformans</i> TAPHD E)	Leaf curl	Peach PRNPS or Nectarine PRNPN	Other relevant Stone fruits		
<i>Tranzschelia</i> spp. 1TRANG (mainly <i>T. discolor</i> TRANDI, <i>T. pruni-spinosae</i> TRANPS)	Rust	Plum or Peach PRNPS	Other relevant Stone fruits		Raspberry RUBID, Sweet almond PRNDU

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data*)	Extrapolation to crops (reduced or no data*)
<i>Monilinia fructigena</i> . MONISP mainly <i>M. laxa</i> MONILA 	Blossom & twig blight and Fruit rot/ Brown rot	Peach PRNPS or apricot or Plum or Cherry	Other relevant Stone fruits	Apple MABSD, Pear PYUCO, Quince CYDOB,	Blueberry (<i>M. vaccinii-corymbosi</i> MONIVC),
<i>Glomerella cingulata</i> GLOMCI and <i>Glomerella acutata</i> COLLAC causing “bitter rot” on pome fruits and anthracnose of stone fruits <i>Gloeosporium coryli</i> on nuts	Fruit rot, Anthracnose	Peach PRNPS or Cherry	Other relevant Stone fruits	Pear PYUCO	Common walnut IUGRE

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no	Extrapolation to crops (reduced or no data*))
(= <i>Neofabraea malicorticis</i> = <i>Cryptosporiopsis sp.</i>) PEZIMA					
<i>Botryosphaeria obtusa</i> BOTSOB <i>B. dothidea</i> BOTSDO ("white mold")	Fruit rot	Peach PRNPS	Other relevant Stone fruits	Grape VITVI, Quince CYDOB, Pear PYUCO,	
<i>Diaporthe eres</i> DIAPER ("Phomopsis canker" also on fruits)	Cankers	Peach PRNPS	Cherry, Plum,	Pear PYUCO, Quince CYDOB	

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no	Extrapolation to crops (reduced or no data*))
<i>Valsa cincta</i> VALSCI or <i>V. leucostoma</i> VALSLE or <i>V. ceratosperma</i> VALSCE	Cankers	Peach PRNPS or Apricot PRNAR	Other relevant <i>Prunus</i> species		
<i>Chondrostereum purpureum</i> STERPU ("silver blight")	Cankers (also leaf silver blight)	Plum or peach PRNPS	Cherry, Nectarine PRNPN, Almond, Apricot PRNAR	Apple MABSD, Pear PYUCO,	
<i>Phomopsis amygdali</i> FUSCAM	Cankers	Peach PRNPS	Plum, Almond, Nectarine PRNPN, Apricot PRNAR		
<i>Eutypa lata</i> EUTYLA	Cankers	Apricot PRNAR	Almond, Plum	Relevant Pome fruit, Grape VITVI	Grape VITVI, Walnuts IUGRE,

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no	Extrapolation to crops (reduced or no data*)) Hazelnuts CYLAV, Citrus, Figs, FIUCA Currents
<i>Cytospora cincta</i> (=Valsa <i>cincta</i>) VALSCI	Dieback of fruit trees	Apricot PRNAR, Peach PRNPS, Sweet almond PRNDU	Sweet almond PRNDU		
<i>Pseudomonas syringae</i> pv <i>avellanae</i> PSDMSY	Bacterial canker	Peach PRNPS, Sweet, almond PRNDU	Plum, Cherry, apricot PRNAR, Sweet almond PRNDU		

Pests		Crops: within stone fruits		Crops: outside stone fruits	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no	Extrapolation to crops (reduced or no data*))
<i>Verticilium dahliae</i> VERTDA	Verticillium wilt	Peach PRNPS, Sweet, almond PRNDU	All cherry, apricot PRNAR, Sweet almond PRNDU		Ornamentals

Table 8. DISEASES ON POME FRUIT:

MABSD apple *Malus domestica*, PYUCO pear *Pyrus communis*, CYDOB quince *Cydonia oblonga*, MABSY crab-apple *Malus sylvestris*, EIOJA loquat *Eryobotria japonica*, MSPGE medlar *Mespilus germanica*, PYUPC Nashi pear *Pyrus pyrifolia* var. *culta*, ABOME black chokeberry *Aronia melanocarpa*, SOUSS mountain ash *Sorbus* sp.

Pest		Crops: within the pome fruits		Crops: outside the pome fruits	
1 Pathogen species	2 Disease group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Podosphaera leucotricha</i> PODOLE <i>Phyllactinia guttata</i> PHYLGU	Powdery mildew	Apple MABSD	Pome fruit		Peach PRNPS, Common hazel CYLAV
<i>Venturia inaequalis</i> VENTIN <i>Venturia pyrina</i> VENTPI <i>Venturia carpophila</i> VENTCA	Scab	Apple MABSD	Pome fruit		Sweet almond PRNDU
<i>Diplocarpon mespili</i> DIPCMA	Leaf spot (or blight)	Pear PYUCO	Quince CYDOB		Sweet chestnut CSNSA
<i>Phoma pomorum</i> PHOMPO	Leaf spot	Apple MABSD	Pear PYUCO	Cherry	Sweet chestnut CSNSA

<i>Alternaria mali</i> ALTEMA (leaf and fruit blotch) or <i>Alternaria alternata</i> ALTEAL	Leaf spot (or blotch)	Apple MABSD	Pear PYUCO		
<i>Monilinia fructigena</i> MONIFG (“brown rot”) also caused by <i>M. laxa</i> MONILA	Blossom and twig blight, Fruit rot	Apple MABSD	Other relevant Pome fruits	Stone fruit	Stone fruit
<i>Glomerella cingulata</i> GLOMCI and <i>Glomerella</i> <i>acutata</i> COLLAC causing “bitter rot” on pome fruits and anthracnose of stone fruits <i>Gloeosporium coryli</i> on nuts(= <i>Cryptosporiopsis</i> sp., <i>Neofabraea malicorticis</i>) PEZIMA	Fruit rot, Anthracnose, Pre- harvest treatments	Apple MABSD	Other relevant Pome fruits	Stone fruit Strawberry FRASS	Common walnut IUGSS Common hazel CYLAV

<i>Fusarium</i> sp., <i>Aspergillus</i> sp.	Fruit rot, Post-harvest treatments	Apple MABSD and Pear PYUCO	Pome fruits		Banana MUBSS, Citrus CIDSS
<i>Neofabraea alba</i> PEZIAL (= <i>Pezicula alba</i>) <i>N. malicorticis</i> PEZIMA	Fruit rot (bullseye rot)	Apple MABSD	Pear PYUCO, Quince CYDOB		
<i>Phyllachora pomigena</i> GLODPO	Sooty blotch	Apple MABSD or Pear PYUCO	Quince CYDOB	Citrus	Citrus
<i>Penicillium</i> spp. PENISP mainly <i>P. expansum</i> PENIEX ("blue mold")	Postharvest fruit rot	Apple MABSD or Pear PYUCO	Other relevant Pome fruits	Citrus	Citrus, Figs FIUCA, Pomegranade PUNGR
<i>Botryosphaeria obtusa</i> BOTSOB <i>B. dothidea</i> BOTSDO ("white	Fruit rot, Frog eye leaf spot	Apple MABSD	Other relevant Pome fruits	Plum PRNDO	

mold”)					
<i>Neonectria galligena</i> (“eye rot”) NECTGA	Fruit rot	Apple MABSD or Pear PYUCO	Other relevant <i>Malus</i> and <i>Pyrus</i> species		
<i>Neonectria galligena</i> NECTGA	Cankers	Apple MABSD or Pear PYUCO	Other relevant Pome fruit		Ornamentals
<i>Pezicula</i> spp. PEZISP (=Neofabrea) (mainly <i>N. alba</i> PEZIAL or <i>N. malicorticis</i> PEZIMA)	Cankers	Apple MABSD	Pear PYUCO, Quince CYDOB		Plum, Peach, Ornamentals
<i>Diaporthe eres</i> DIAPER (“Phomopsis canker” also on fruits)	Cankers	Apple MABSD	Pear PYUCO, Quince CYDOB	Cherry, Plum PRNDO,	Ornamentals
<i>Valsa cincta</i> VALSCI or V.	Cankers	Apple	Pear	Relevant <i>Prunus</i> species	Ornamentals

<i>leucostoma</i> VALSLE or <i>V. ceratosperma</i> VALSCE					
<i>Eutypa lata</i> EUTYLA	Cankers	Apple MABSD	Other relevant Pome fruits	Grape VITVI	Apricot PRNAR Ornamentals
<i>Spilocaea oleaginae</i> <u>(=Cycloconium oleaginum)</u> <u>CYCLOL</u>	Olive knot	Malus sp. MABSS			Olive OLVSS
<i>Botryotinia fuckeliana</i> BOTRCI	Fruit rot	Apple MABSD	Other relevant Pome fruits	Grape, Plum, Cherry, Apricot, Nectarine	Figs FIUCA, kiwi ATIDE, citrus, Common hazel CYLAV
<i>Pseudomonas syringae</i> pv avellanae PSDMSY	Bacterial canker	Apple MABSD, Pear PYUCO			Sweet almond PRNDU

<i>Erwinia chrysanthemi</i> ERWICH	Bacterium disease	Apple MABSD			Pineapple ANHCO
<i>Phytophthora</i> spp. PHYTSP <i>mainly P. cactorum</i> PHYTCC <i>or P. syringae</i> PHYTSY	Fruit rot	Apple MABSD	Other relevant Pome fruits		Figs FIUCA, citrus, avocado PEBAM, kiwi ATIDE, common walnut IUGSS

Table 9. DISEASES ON NUT TREES

PRNDU sweet almond *Prunus dulcis*, CYLAV hazelnut *Corylus avellana*, IUGRE walnut *Juglans regia*, CSNSA sweet chestnut *Castanea sativa*, PIAVE pistachio *Pistacia vera*, Macadamia nuts *Macadamia integrifolia*, Cashew nuts *Anacardium occidentale*, coconut *Cocos nucifera*

Pests		Crops: within the tree nuts		Crops: outside the tree nuts	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Phytophthora spp</i>	Stem Canker	Macadamia or cashew nuts	All relevant tree nuts		
<i>Xylaria arbuscula</i>	Slow and quick tree decline	Macadamia			
<i>Botrytis cinerea</i>	Raceme blight	Macadamia			
<i>Pseudocercospora macadamiae</i>	Husk spot	Macadamia			
<i>Oidium spp</i>	Powdery mildew	Cashew nuts or coconut	All relevant tree nuts		
<i>Septoria spp</i>	leaf spot	Cashew nuts	All relevant tree nuts		
<i>Marasmiellus cocophilus</i>	Lethal bole rot	Coconut			
<i>Phytoplasma spp</i>	Lethal yellowing	Coconut			
<i>Phytophthora spp</i>	Bud rot /heart rot	Coconut or macadamia	All relevant tree nuts		
<i>Phytophthora spp</i> <i>Pythium spp</i>	Root rot	Coconut or macadamia	All relevant tree nuts		

Pests		Crops: within the tree nuts		Crops: outside the tree nuts	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no	Extrapolation to crops (reduced or no data*)
<i>Rhizoctonia spp</i>					
<i>Pestalotiopsis palmarum</i>	Gray leaf blight	Coconut			
<i>Colletotrichum spp</i>	Anthracnose	Cashew nuts or macadamia	All relevant tree nuts		
<i>Gloeosporium amygdalinum</i> (= <i>Glomerella cingulata</i>) GLOMCI	Anthracnose	Common walnut IUGRE	Sweet almond PRNDU, pistachio PIAVE	Apple MABSS, Pear PYUSS, Sweet cherry PRNAV	Cherry laurel PRNLR, Rosebay NEROL, Apple MABSS
<i>Gnomonia leptostyla</i> GNOMLE		Common walnut IUGRE			Heart Cherry PRNAJ
<i>Sphaceloma coryli</i> SPHASP		Common walnut IUGRE	Common hazel CYLAV		
<i>Monilinia fructicola</i> MONIFC	Brown rot of stone fruits	Sweet almond PRNDU		Plum PRNDO, Pear PYUSS, Apple MABSS,	Apricot PRNAR, Heart
<i>Monilinia fructigena</i> MONIFG		Almond	Common hazel CYLAV		Cherry PRNAJ, Quince CYDOB, Medlar

Pests		Crops: within the tree nuts		Crops: outside the tree nuts	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no Peach PRNPS, Nectarine	Extrapolation to crops (reduced or no data*)

b. EXTRAPOLATION TABLE for EFFECTIVENESS of INSECTICIDES AND NEMATICIDES

Table 1. PESTS AND NEMATODES ON TROPICAL AND SUBTROPICAL FRUITS (EDIBLE PEEL)

Dates *Phoenix dactylifera* PHXDA, Figs *Ficus carica* FIUCA, Table olives *Olea europaea* OLVEU, Carambolas *Averrhoa carambola* AVRCA, Kaki *Diospyros kaki* DOSKA, Jamblus *Syzygium cumini* SYZCU, Guava *Psidium guajava*

Pests		Crops: within Tropical and Subtropical Fruit (Edible Peel)		Crop: outside Tropical and subtropical Fruit (Edible Peel)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Ceroplastes rusci</i> CERPRU	Scales	Fig FIUCA or Olive OLVEU	Kaki DOSKA,	Citrus CIDSS	Persimmon DOSVI, <i>Citrus sp.</i> CIDSS
<i>Parlatoria oleae</i> PARLOL, <i>Lepidosaphes ulmi</i> LEPSUL, <i>Lichtensia</i> <i>viburni</i> LITEVI, <i>Filippia</i> <i>follicularis</i> FILIFO, <i>Pollinia</i> <i>pollini</i> POLNPO		Olive OLVEU or dates		Apple MABSD, Common walnut IUGRE, Peach PRNPS	
<i>Saissetia oleae</i> SAISOL			Fig FIUCA	Citrus CIDSS	Citrus CIDSS
<i>Carpolonchaea</i> <i>aristella</i>	Fruit flies	Fig FIUCA or Guava		Peach PRNPS	

(=Lonchaea aristella) CAROAR					
<i>Ceratitis capitata</i> CERTCA			Kaki DOSKA	Peach PRNPS, Pear PYUCO	Persimmon DOSVI, Citrus CIDSS, Apple MABSD, Kiwi ATIDE,
<i>Bactrocella</i> <i>sp</i>		Guava			
<i>Conotrachelus psidii</i> <i>Rhynchophorus</i>	Weevil	Guava, dates	Guava, dates		
<i>Coccus viridis</i> <i>Pulvinaria psidii</i>	Scale insect (green scale, green shield sale)	Guava	All relevant tropical and subtropical fruits with edible peel		
<i>Selenothrips rubrocinctus</i> <i>Gynaikothrips uzeli</i> <i>Liothrips oleae</i>	Thrips	Guava or olives or fig	Guava, olives, fig		
<i>Aceria ficus</i> , <i>Brevipalpus phoenicis</i> <i>Oxycenus maxwelli</i>	mites	Fig or Guava or olive	Fig, Guava, olive		
<i>Leptoglossus phyllopus</i>	Leaffooted bug	Olive			
<i>Acrosternum hilare</i> <i>Proxys punctulatus</i>	Stink bug	Guava, olive	Guava, olive		

<i>Argyresthia eugeniella</i> lesser date moth (<i>Batrachedra amydrula</i>)	moth	Guava, date palm	Guava, date palm		
<i>Metaleurodicus cardin</i> , <i>Singhiella simplex</i>	whitefly	Guava or date palm or fig	Guava, date palm, fig		
<i>Meloidogyne</i> spp	Root knot nematodes	Guava or olive,	Any relevant tropical and subtropical fruits with edible peel		

Table 2. PESTS AND NEMATODES ON TROPICAL AND SUBTROPICAL FRUITS (INEDIBLE PEEL, LARGE)

Avocado *Persea americana* PEBAM, Banana *Musa acuminata* MUBAC *Musa balbisiana* MUBBA, Mango *Mangifera indica* MNGIN, Papaya *Carica papaya* CIAPA, Pomegranate *Punica granatum* PUNGR, Cherimoyas *Annona cherimola* ANUCH, Guavas *Psidium guajava* PSIGU, Pineapple *Ananas comosus* ANHCO, Breadfruit *Artocarpus altilis* ABFAL, Durian *Durio zibethinus* DURZI, Soursops *Annona muricata* ANUMU

Pest s		Crops: within Tropical and Subtropical (Inedible Peel Large)		Crops: outside Tropical and Subtropical (Inedible Peel Large)	
		3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Pseudacysta perseae</i> PSEYPE, <i>Planococcus citri</i> PSECCI, <i>Saissetia oleae</i> SAISOL, <i>Ceroplastes sinensis</i> CERPSI	Lace bug	Avocado PEBAM or Mango MNGIN or Pomegranate PUNGR		Plane PLTSS, Citrus fruit, Olea 1OLVG	Eggplant SOLME
<i>Oligonychus</i> sp. OLIGSP (e.g. <i>O. perseae</i>), <i>Aceria granati</i> (=Eriophyes	Mites	Avocado PEBAM or Guava PSISS or Papaya CIAPA or	Guava PSISS, Mango MNGIN, Papaya CIAPA, Banana	Citrus CIDSS, Peach PRNPS, Apple MABSS, Banana MUBSS, Passion	Passion fruit PAQSS

Pests		Crops: within Tropical and Subtropical (Inedible Peel Large)		Crops: outside Tropical and Subtropical (Inedible Peel Large)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>granati</i>) ACEIGA, <i>Lorrea</i> <i>formosa</i> LORRFO, <i>Tenuipalpus punicae</i> TENUPU		Mango MNGIN or Pomegranate PUNGR	MUBSS	fruit PAQSS	
<i>Paratetranychus</i> <i>yotheri</i> PARTYO, <i>Aceria</i> <i>mangiferae</i> ERPHMG	Mites	Mango MNGIN or Avocado PEBAM or Banana MUBSS or Guava PSISS or Papaya CIAPA	Avocado PEBAM, Papaya CIAPA, Guava PSISS, Banana MUBSS	Citrus CIDSS, Peach PRNSP, Apple MABSS, Passion fruit PAQSS	Passion fruit PAQSS
<i>Chrysomphalus</i> sp. CHRYSP, <i>Hemiberlesia</i> sp. HEBESP, <i>Paracoccus</i> sp. PRCCSP,	Scales	Avocado PEBAM or Banana MUBSS or Guava PSISS or Mango MNGIN or	Guava PSISS, Papaya CIAPA, Mango MNGIN, Banana MUBSS, Pineapple	Citrus CIDSS, Peach PRNSP, Apple MABSS,	

Pests		Crops: within Tropical and Subtropical (Inedible Peel Large)		Crops: outside Tropical and Subtropical (Inedible Peel Large)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Paracoccus marginatus</i> PACOMA, <i>Pseudococcus</i> sp. PSECSP, <i>Pseudococcus jackbeardsleyi</i> PSECJB, <i>Dysmicoccus brevipes</i> DYSMBR <i>Icerya seychellarum</i> ICERSE <i>Dysmicoccus grassii</i> DYSMGR <i>Pseudaulacaspis pentagona</i> PSEAPE		Pineapple ANHCO or Papaya CIAPA	ANHCO		
<i>Bephratelloides pomorum</i> 1BEGHP	Hymenoptera	Cherimoya ANUCH or all other annonaceae ANUSS	All other annonaceae ANUSS	Peach PRNSP	
<i>Pentalonia nigronervosa</i>	Aphids	Banana MUBSS or		Citrus CIDSS	

Pests		Crops: within Tropical and Subtropical (Inedible Peel Large)		Crops: outside Tropical and Subtropical (Inedible Peel Large)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
PENLNI, <i>Aphis punicae</i> APHIPU <i>Aphis gossypii</i> APHIGO, <i>Aphis fabae</i> APHIFA		Mango MNGIN or Pomegranate PUNGR	Banana MUBSS Mango MNGIN Pomegranate PUNGR	Peach PRNSP	
<i>Telchin licus</i> (= <i>Castnia licus</i>) CASTLI	Caterpillars	Banana MUBSS		Apple MABSS, Peach PRNPS, Coffe COFAR, Passion fruit PAQSS	Coffee COFAR, Passion fruit PAQSS
<i>Solenopsis geminata</i> SOLEGE	Ants	Banana MUBSS, Pineapple ANHCO	Pineapple ANHCO	Citrus CIDSS, Sugar cane SACSS, Passion fruit PAQSS	Passion fruit PAQSS, Sugar cane SACSS
<i>Crematogaster sp.</i> CREMSP		Pineapple ANHCO, Banana MUBSS,	Banana MUBSS,	Citrus CIDSS, Sugar cane SACSS, Passion fruit PAQSS	Passion fruit PAQSS, Sugar cane SACSS

Pest s		Crops: within Tropical and Subtropical (Inedible Peel Large)		Crops: outside Tropical and Subtropical (Inedible Peel Large)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Aleurodicus dispersus</i> ALEDDI, <i>Aleurothrixus floccosus</i> ALTHFL, <i>Dialeurodes citrifolii</i> DIALCT, <i>Orchamoplatus mammaeferus</i> ORCMMA	Whiteflies	Avocado PEBAM Banana MUBSS, Guava PSISS Mango MNGIN, Papaya CIAPA	Guava PSISS, Papaya CIAPA, Mango MNGIN, Banana MUBSS, Avocado PEBAM	Citrus CIDSS, Palmtree	Palmtree
<i>Selenothrips rubrocinctus</i> SLENRU <i>Heliothrips haemorrhoidalis</i> HELTHA, <i>Thrips sp.</i> THRISP <i>Chaetanepothrips sp.</i> CHANSP <i>Danothrips trifasciatus</i> DANOTR	Thrips	Avocado PEBAM, Guava PSISS, Banana MUBSS, Mango MNGIN	Mango MNGIN, Guava PSISS, Banana MUBSS,	Peach PRNPS, Citrus CIDSS, Passion fruit PAQSS	Passion fruit PAQSS

Pest s		Crops: within Tropical and Subtropical (Inedible Peel Large)		Crops: outside Tropical and Subtropical (Inedible Peel Large)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Elixothrips brevisetis</i> ELIXBR <i>Frankliniella parvula</i> FRANPR					
<i>Lygus sp.</i> LYGUSP	Bug	Mango MNGIN	Avocado PEBAM	Pear PYUSS	
<i>Radopholus similis</i> RADOSI	Nematodes	Banana MUBSS	Pineapple ANHCO	Citrus CIDSS, Tropical root vegetables	Tropical root vegetables,
<i>Rotylenchulus reniformis</i> ROTYRE		Pineapple ANHCO, Banana MUBSS	Pineapple ANHCO, Banana MUBSS	Citrus CIDSS, All tropical root vegetables, other sensitive vegetable crops	
<i>Meloidogyne spp</i>	Nematodes	Mango or avocado or Guava or papaya	All relevant Tropical and Subtropical fruits		
<i>Tetranychus sp.</i>	Mites	Papaya CIAPA	Mango MNGIN,	Citrus CIDSS, Apple MABSS,	Passion fruit PAQSS

Pest s		Crops: within Tropical and Subtropical (Inedible Peel Large)		Crops: outside Tropical and Subtropical (Inedible Peel Large)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
TETRSP		Banana MUBSS, Guava PSISS, Avocado PEBAM, Mango MNGIN	Avocado PEBAM, Guava PSISS, Banana MUBSS	Peach PRNPS, Passion fruit PAQSS	

Table 3. PESTS AND NEMATODES ON TROPICAL AND SUBTROPICAL FRUITS (INEDIBLE PEEL, SMALL)

Kiwi *Actinidia deliciosa* ATIDE and *Actinidia chinensis* ATICH, Litchis *Litchi chinensis* LIHCH, Passionfruit *Passiflora edulis* PAQED, Pricky pears *Opuntia ficus-indica* OPUFI, Star apples *Chrysophyllum cainito* CSFCA, American persimons *Diospyros virginiana* DOSVI

Pests		Crops: within TROPICAL AND SUBTROPICAL FRUIT (Inedible Peel, small)		Crops: outside Tropical and subtropical Fruit (Inedible Peel, small)	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Pseudaulacaspis pentagona</i> PSEAPE	Scales	Kiwi fruit ATIDE	All relevant tropical and subtropical fruits with inedible peel, small	Peach PRNPS, Apple MABSD	Almond PRNDU
<i>Metcalfa pruinosa</i> METFPR	Leafhoppers			Grapevine VITVI Olive OLVEU Citrus CIDSS Peach PRNPS, Plum PRNDO	Citrus CIDSS, Ornamentals
<i>Ceratitis capitata</i> CERTCA	Fruit flies			Apple MABSD, Peach PRNPS, Citrus CIDSS, Fig FIUCA, Pear PYUCO Kaki DOSKA	Citrus CIDSS

<i>Drosophila suzuki</i> DROSSU				Cherry PRNAV, Plum PRNDO, Apricot PRNAR, Strawberry FRASS, Blackberry RUBFR, Raspberry RUBID	
<i>Ceratitis sp.</i> CERTSP or <i>Bactrocera sp.</i> BCTRSP, or <i>Anastrepha sp.</i> ANSTSP		Litchi LIHCH Passion fruit PAQSS	Passion fruit PAQSS Litchi LIHCH	Citrus CIDSS, Peach PRNSP, <i>Annonaceae</i> ANUSS, Mango MNGIN, Guava PSISS, Starfruit AVRCA, Papaya CIAPA	Mango MNGIN, Papaya CIAPA, Starfruit AVRCA, <i>Annonaceae</i> ANUSS, Guava PSISS
<i>Cryptophlebia peltastica</i> ARGPPE	Worms	Litchi LIHCH		Apple MABSS, Peach PRNPS, <i>Annonaceae</i> ANUSS, Pineapple ANHCO	Pineapple ANHCO, <i>Annonaceae</i> ANUSS
<i>Aceria litchi</i> ERPHLI	Mites				
<i>Heliconius spp.</i> HELUSP	Caterpillars	Passion fruit PAQSS		<i>Cucurbitaceae</i> 1CUCF, Coffe COFAR, Banana MUBSS	Coffee COFAR, Banana MUBSS
<i>Paratrechina longicornis</i> PAATLO <i>Solenopsis geminata</i> SOLEGE	Ants			Citrus CIDSS, Banana MUBSS, Sugar cane SACSS, Pineapple ANHCO	Pineapple ANHCO, Banana MUBSS, Sugar cane SACSS
<i>Meloidogyne sp.</i>	Nematodes	Kiwi fruit ATIDE or passion fruit or Litchi	All relevant tropical and subtropical fruits	Rose ROSAR	

MELGSP			– inedible peels- small-		
<i>Helix</i> sp. 1HELXG, <i>Limax</i> sp.1LIMXG	Snails and slugs	Kiwi fruit ATIDE			
<i>Thrips</i> sp.	Thrips	Passion fruit PAQSS		Citrus CIDSS, Peach PRNPS, Mango MNGIN, Avocado PEBAM, Guava PSISS	Avocado PEBAM, Guava PSISS, Banana MUBSS, Mango MNGIN
<i>Tetranychus</i> sp. TETRSP <i>Brevipalpus</i> sp. BRVPSP	Mites	Passion fruit PAQSS		Apple MABSS, Citrus CIDSS, Peach PRNPS, <i>Cucurbitaceae</i> 1CUCF, Banana MUBSS, Guava PSISS, Papaya CIAPA, Avocado PEBAM, Mango MNGIN	Avocado PEBAM, Papaya CIAPA, Mango MNGIN, Guava PSISS, Banana MUBSS

Table 4. PESTS AND NEMATODES ON CURRANTS AND BERRIES

Cowberry *Vaccinium vitis-idaea* VACVI, Cranberry *Vaccinium macrocarpon* VACMA, Bilberry *Vaccinium myrtillus* VACMY, Mossberry *Vaccinium oxycoccos* VACOX, Blueberry *Vaccinium corymbosum* VACCO, Blackberry *Rubus fruticosus* RUBFR, Burbank's thornless blackberry *Rubus ulmifolius* RUBUL, Raspberry *Rubus idaeus* RUBID, Tayberry *Rubus Tayberry hybrids* RUBTY, Boysenberry, Loganberry, Veitchberry *Rubus x loganobaccus* RUBLO, Black currant *Ribes nigrum* RIBNI, Red and white currants *Ribes rubrum* RIBRU, Gooseberry *Ribes uva-crispa* RIBUC, Grapes

Pest		Crop: currants and berries		Crops: outside currants and berries	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Aphis schneideri</i> APHISC, <i>Aphis</i> sp. APHISP, <i>Cryptomyzus ribis</i> CRYMRI, <i>C. galeopsidis</i> MYZLGA, <i>Aphidula grossulariae</i> (= <i>Aphis grossulariae</i>) APHDGR, <i>Hyperomyzus</i> sp. HYPESP, <i>Rhopalosiphoninus ribesinis</i> RHOSRI, <i>Nasonovia ribisnigri</i> NASORN	Aphids	Blackcurrant RIBNI or Redcurrant RIBRU or Blue Berry VACCO	Cranberry, Bilberry VACMY, Gooseberry RIBUC,	Apple MABSS, Lettuce LACSA	
<i>Aphis idaei</i> APHIID or <i>Aphis</i> sp. APHISP or <i>Amphorophora rubi</i> or AMPHRU or <i>Aphis ruborum</i> APHIRB or <i>Sitobion fragariae</i>	Aphids	Raspberry RUBID or Blackberry RUBUL	Cane fruit. RUBSS	Apple MABSS	

Pest		Crop: currants and berries		Crops: outside currants and berries	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
MACSFR					
<i>Pulvinaria vitis</i> PULVVI <i>Pseudaulacaspis pentagona</i> PSEAPE, <i>Quadraspidiotus perniciosus</i> QUADPE, <i>Parthenolecanium corni</i> (=Eulecanium corni) LECACO	Scales	Raspberry RUBID or Blackcurrant RIBNI or Blue berries VACCO	Cranberry VACVI, Bilberry VACMY, Red Currant RIBRU, Black berries	Peach PRNPS, Apple MABSS, Vineyard VITSS, Sweet almond PRNDU, Common walnut IUGRE	Woody ornamentals
<i>Dasineura tetensi</i> DASYTE, <i>Dasineura</i> sp DASYSP	Midges	Redcurrant (or Whitecurrant) RIBRU or Blackcurrant RIBNI	<i>Ribes</i> sp. RIBSS, <i>Vaccinium</i> sp. VACSS, <i>Rubus</i> sp RUBSS	Ornamentals, Apple MABSS, Pear PYUSS	<i>Dasineura</i> sp*. in Apple MABSS, Pear PYUCO, Quince CYDOB, Medlar MSPGE, Ornamentals
<i>Resseliella theobaldi</i> THOMTE, <i>Lasioptera rubi</i> LASORU	Midges	Raspberry RUBID	<i>Ribes</i> sp. RIBSS, other <i>Rubus</i> sp RUBSS	Ornamentals, Pear PYUSS	Ornamentals Mango MNGIN, Lavender LAVSS

Pest		Crop: currants and berries		Crops: outside currants and berries	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Drosophila suzukii</i> DROSSU	Fruit flies	Raspberries. RUBSS or cranberry. VACVI or Blue berry VACCO	<i>Rubus</i> sp. RUBSS, <i>Ribes</i> sp. RIBSS <i>Vaccinium</i> sp. VACSS. Blueberry VACCO, grapes	Cherry PRNAV Strawberry FRAAN	Stone fruits, Grapes VITVI Strawberries FRAAN, Figs FIUCA, Persimmon DOSKA, Kiwi ATIDE
<i>Rhagoletis mendax</i>	Fruit flies	Raspberries. RUBSS or cranberry. VACVI or Blue berry VACCO	<i>Rubus</i> sp. RUBSS, <i>Ribes</i> sp. RIBSS <i>Vaccinium</i> sp. VACSS. Blueberry VACCO		
<i>Thaumatotibia leucotreta</i>	False codling moth	Grapes	Any relevant berry and currants		
<i>Anthonomus rubi</i> ANTHRU or <i>Byturus tomentosus</i> BYTUTO	Bud weevils	<i>Rubus</i> sp. RUBSS	<i>Rubus</i> sp. RUBSS	Strawberry* FRAAN, Apple MABSS	
<i>Synanthedon myopaeformis</i> SYNAMY <i>Synanthedon tipuliformis</i> SYNATI	Clearwing moths	Blackcurrant RIBNI or Redcurrant RIBRU or	Other <i>Ribes</i> sp. RIBSS <i>Vaccinium</i> sp. VACSS	Apple* MABSS	

Pest		Crop: currants and berries		Crops: outside currants and berries	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to othercrops	5 Data from these cropscan support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
		Gooseberry RIBUC			
<i>Synanthedon hyaleiformis</i> SYNASP		Raspberry RUBID	Other <i>Rubus</i> sp. RUBSS	Apple* MABSS	
<i>Paralobesia viteana</i>	Grape Berry Moth	Grapes or black berry	Any relevant berry and currants		
<i>Altica spp</i>	Grape Flea Beetles	Grapes, blue berry	Any relevant berry and currants		
<i>Halyomorpha halys</i>	Brown Marmorated Stink Bug Bmsb	Grapes or blue berry or raspberry	Any relevant berry and currants		
<i>Otiorhynchus sulcatus</i>	Black Vine Weevil	Grapes or black currant	Any relevant berry and currants		
<i>Planococcus spp</i> <i>Dysmicoccus vaccinii</i> <i>Pseudococcus spp</i>	Mealybug	Grapes or blue berry or raspberry	Any relevant berry and currants		
<i>Ampelogypter ater</i>	Grape Cane Girdler	Grapes or raspberry	Any relevant berry and currants		
<i>Popillia Japonica</i>	Japanese Beetle	Grapes or blue berry	Any relevant berry and currants		
<i>Meloidogyne sp.</i> MELGSP <i>Xiphinema spp</i> <i>Longidorus africanus</i> <i>Tylenchulus</i>	Nematodes	Blue berries VACCO or Black berries RUBFR or raspberry RUBSS	All relevant berries, currants and grapes		

Pest		Crop: currants and berries		Crops: outside currants and berries	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>semipenetrans</i> <i>Mesocriconema</i> (= <i>Criconemella</i>) <i>xenoplax</i> <i>Hemicriconemoides</i> spp.					

Table 5. PESTS AND NEMATODES IN STRAWBERRIES

FRASS *Fragaria* sp.

Pests		Crops: Strawberry		Crops: outside Strawberry	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Aphis gossypii</i> APHIGO, <i>Rhodobium porosum</i> METOPO (for protected conditions), <i>Chaetosiphon fragaefolii</i> CHTSFR, <i>Fimbriaphis fimbriata</i> FIMBFI, <i>Macrosiphum rosae</i>	Aphids	Strawberry FRASS (protected conditions)	Strawberry FRASS (field conditions)	Ornamentals, Lettuce LACSA	Ornamentals, Tomato LYPES Cucumber CUMSC

Pest s		Crops: Strawberry		Crops: outside Strawberry	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
MACSRO, <i>Aphis fabae</i> APHIFA					
<u><i>Anthonomus rubi</i></u> ANTHRU	Blossom weevil	Strawberry FRASS			Blackberry RUBFR, Raspberry RUBID, <i>Byturus tomentosus</i> BYTUTO in raspberry
<u><i>Otiorhynchus sulcatus</i></u> OTIOSU, <i>Phyllobius pomaceus</i> PLLBPM	Weevils (adults)	Strawberry FRASS		Tree nursery* (adults)	Grape VITSS, Peach PRNPS (protected conditions), Crops for seed production, Perennial ornamentals
<u><i>Tetranychus urticae</i></u> TETRUR	Mites	Strawberry FRASS		Cucumber CUMSC Tomato LYPES Apples MABSD Ornamentals	Herbs, crops for seed production, Ornamentals Apple MABSD, Cucumber CUMSC
<i>Phytonemus pallidus</i> subsp. <i>fragariae</i> (<i>Tarsonemus pallidus</i>) TARSPA	Mites	Strawberry FRASS		Ornamentals	Crops for seed production Ornamentals

Pests		Crops: Strawberry		Crops: outside Strawberry	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
<i>Frankliniella occidentalis</i> FRANOC, <i>Thrips tabaci</i> THRITB, <i>Thrips fuscipennis</i> THRIFU	Thrips	Strawberry FRASS (<u>protected conditions</u>)	Strawberry FRASS (field conditions)	Ornamentals, Solanaceae	Rubus sp. RUBSS, Vitis sp. VITSS, Peach sp. Herbs, Crops for seed production, Tomato LYPES
<i>Cixius wagnerii</i> CIXIWA	Leafhoppers	Strawberry FRASS		Ornamentals Potato	Herbs, Crops for seed production, Celeriac APUGR
<i>Drosophila suzukii</i> DROSSU <i>Rhagoletis mendax</i>	Fruit fly	Strawberry FRASS		Bush fruit, Cherries	Bush fruit, Cherries Plum PRNDO, Elderberry 1SAMG
<i>Otiorhynchus sulcatus</i> OTIOSU, <i>Phyllobius pomaceus</i> PLLBPM	Weevils (larvae)	Strawberry FRASS		Tree nursery* (larvae)	Grape VITSS, Peach PRNPS (indoor), Perennial ornamentals
<i>Autographa gamma</i> PYTOGA, <i>Cacoecimorpha pronubana</i> TORTPR <i>Plusia</i> sp. PLUSSP <i>Plutella xylostella</i> PLUTMA <i>Sparganothis pilleriana</i> SPARPI	Caterpillars	Strawberry FRASS		Apples, ornamentals	Ornamentals, Crops for seed production

Pests		Crops: Strawberry		Crops: outside Strawberry	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
<i>Trialeurodes vaporariorum</i> TRIAVA, <i>Bemisia tabaci</i> BEMITA	Whiteflies	Strawberry FRASS		Ornamentals	Tomato LYPES, Cucumber CUMSC
<i>Agrotis</i> sp. AGROSP	Cutworms	Strawberry FRASS	Vegetables		Seeds crops, Vegetables
<i>Meloidogyne hapla</i> MELGHA <i>Pratylenchus penetrans</i> PRATPE, <i>Ditylenchus dipsaci</i> DITYDI, <i>Longidorus</i> spp. <i>Xiphinema</i> spp. (vectors of virus; ArMV and SLRSV)	Nematodes	Strawberry FRASS		Soil treatment prior to any other susceptible crop	Soil treatment prior to any other susceptible crop
<i>Aphelenchoides fragariae</i> , <i>Aphelenchoides ritzemabosi</i> ,	Nematodes	Strawberry FRASS		Ornamentals	Ornamentals, seedscrops
<i>Plagiognathus arbustorum</i> , <i>Lygus rugulipennis</i> , <i>L. pabulinus</i>	Bug	Strawberry FRASS		Cucumber CUMSC	Cucumber CUMSC
<i>Spodoptera exigua</i>	Armyworm	Strawberry FRASS			

Pest s		Crops: Strawberry		Crops: outside Strawberry	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crop s	5 Data from these crops can support the indicator crops (reduced data or no	6 Extrapolation to crops (reduced or no data*)
<i>Popillia japonica</i>	Japanese beetle	Strawberry FRASS			

Table 6. PESTS AND NEMATODES ON CITRUS FRUIT

CIDPA Grapefruit *Citrus paradisi*, CIDSI Orange *Citrus sinensis*, CIDLI Lemon *Citrus limon*, CIDAF Lime *Citrus aurantifolia*, CIDRE Mandarin *Citrus reticulata sensu stricto*, FOLMA and FOLJA Kumquats *Fortunella margarita*, *F. japonica*

Pest s		Crops: within the Citrus fruit		Crops: outside the Citrus fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Eutetranychus</i> sp. EUTESP <i>Eutetranychus</i> <i>orientalis</i> EUTEOR	Tetranychida e (spider mites)	Orange CIDSI or Mandarin CIDRE or Lemon CIDLI	Any Citrus	Apple MABSD	Avocado PEBAM, Papaya CIAPA, Guava PSISS Ornamental trees (only for <i>Eutetranychus orientalis</i> e.g. <i>Albizia</i> sp. ALBSS

					and <i>Acacia</i> sp. ACASS)
<i>Aceria sheldoni</i> ACEISH <i>Phyllocoptruta oleivora</i> PHYUOL	Eriophyidae (Eriophyid mites)				
<i>Hemitarsonemus</i> sp. HEMTSP, <i>Polyphagotarsonemus latus</i> HEMTLA	Broad mites	Any Citrus			Papaya CIAPA
<i>Diaphorina citri</i> DIAACI, <i>Triozaerythrae</i> TRIZER	Psyllid	Orange CIDS I or Mandarin CIDRE or Lemon CIDLI			
<i>Prays citri</i> PRAYCI <i>Phyllocnistis citrella</i> PHYNCI	Citrus flower moth	Orange CIDS I or Mandarin CIDRE or Lemon CIDLI	Any Citrus		
<i>Toxoptera citricida</i> TOXOCI, <i>Toxoptera aurantii</i> TOXOAU, <i>Aphis spiraecola</i> (=Aphis citricola) APHISI, <i>Aphis gossypii</i> APHIGO, <i>Myzus persicae</i> MYZUPE	Aphids				Banana MUBSS

<i>Ceratitis capitata</i> CERTCA	Fruit flies
<i>Icerya purchasi</i> ICERPU, <i>Pseudococcus</i> sp. PSECSP, <u><i>Ceroplastes</i></u> <u><i>sinensis</i></u> CERPSI, <u><i>Aonidiella</i></u> <u><i>aurantii</i></u> AONDAU, <i>Aonidiella</i> <i>citrina</i> AONDCI, <i>Parlatoria</i> sp PARLSP, <i>Aspidiotus nerii</i> ASPDNE, <i>Chrysomphalus</i> <i>dictyospermi</i> CHRYDI, <i>Lepidosaphes</i> <i>ulmi</i> LEPSUL, L. <i>beckii</i> LEPSBE, L. <i>gloverii</i> LEPSGL, <i>Planococcus</i> <i>citri</i> PSECCI, <i>Saissetia oleae</i> SAISOL, <i>Coccus</i> <i>hesperidum</i> COCCHE,	Scales

Apple MABSD ,Peach PRPNS, Pear PYUCO, Fig FIUCA, Kaki DOSKA	Annonnacea ANUSS, Guava PSISS, Papaya CIAPA, Mango MNGIN, Passion fruit PAQSS, Apple MABSS, Litchi LINCH, Starfruit AVRCA, PeachPRNPS Apple MABSD Kiwi ATIDE Quince CYDOB Pomegranate PUNGR Kaki DOSKA
Fig FIUCA (for Ceroplastes), Olive OLVEU(for Saissetia)	Banana MUBSS, Guava PSISS, Mango MNGIN, Pineapple ANCHO, Papaya CIAPA, Avocado PEBAM, Common walnut IUGRE, Common hazelnut CYLAV, Pistachio, Sweet almond PRNDU (primarily affected by <i>Sphaerolecanium</i> <i>prunastri</i>), Tree nuts are affected secondarily by <i>Ceroplastes</i> , <i>Coccus</i> , <i>Saissetia</i> , Ornamental shrubs

<i>Unaspis yanonensis</i> UNASYA					
<i>Empoasca</i> sp. EMPOS, <i>Empoascini</i> spp. EMPOSP <i>Asymmetrasca</i> <i>decedens</i> EMPODC, <i>Metcalfa pruinosa</i> METFPR	Leafhoppers	Orange CIDS I or Mandarin CIDRE or Lemon CIDLI	Any Citrus	Vineyard VITSS, PeachPRNPS, Kiwi ATIDE	
<i>Zeuzera pyrina</i> ZEUZPY	Wood and rootborers			Common walnut IUGRE, Sweet chestnut CSNSA, Common hazelnut CYLAVPome fruit	Nut trees
<i>Tapinoma nigerrimum</i> TAPINI <i>Lasius grandis</i> LASIGR	Ants				Banana MUBSS, Passion fruit PAQSS, Pineapple ANHCO, Sugar cane SACSS
<i>Aleurothrixus floccosus</i> ALTHFL, <i>Dialeurodes</i> <i>citri</i> DIALCI, <i>Parabemisia myricae</i> PRABMY	Whiteflies	Any citrus			Avocado PEBAM, Guava PSISS, Papaya CIAPA, Banana MUBSS, Mango MNGIN, Palmtree
<i>Tylenchulus semipenetrans</i> TYLESE	Citrus nematod es	Orange CIDS I		Pear PYUCO Olive OLVEU	Banana MUBSS, Pineapple ANHCO, All tropical root vegetables
Species that, secondarily, affect <i>Citrus</i> sp.: <i>Xiphinema</i> <i>americanum</i> XIPHAM, <i>Helicotylecnhus</i> sp. HELYSP				Grapevine VITVI for <i>Xiphinema americanum</i>	

<i>Scirtothrips aurantii</i> SCITAU, <i>Selenothrips rubrocinctus</i> SLENRU, <i>Heliothrips haemorrhoidalis</i> HELTHA, <i>Pezothrips kellyanus</i> PEZTKE	Thrips	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI		Peach PRNPS	
<i>Thaumatotibia leucotreta</i>	False Codling moth	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI	Orange CIDSi, Mandarin CIDRE, Lemon CIDLI		
<i>Papilio demodocus</i>	Orange dog	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI	Orange CIDSi, Mandarin CIDRE, Lemon CIDLI		
<i>Phyllocnistis citrella</i>	Citrus leaf miner	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI	Orange CIDSi, Mandarin CIDRE, Lemon CIDLI		
<i>Pseudococcidae citri/Planococcus citri</i>	Mealy bugs	Orange CIDSi or Mandarin CIDRE or Lemon CIDLI	Orange CIDSi, Mandarin CIDRE, Lemon CIDLI		

Table 7. PESTS AND NEMATODES ON STONE FRUIT:

PRNPS peach *Prunus persica* including PRNPN nectarine *P. persica* var. *nucipersica* (and similar hybrids), PRNAR apricot *P. armeniaca*, PRNDU almond *P. dulcis*, PRNDO plum *P. domestica*, PRNDD damson plum *P. damascena*, PRNDS Mirabelle *P. domestica* var. *syriaca*, PRNDI greengage (reine-claude) *P. domestica* subsp. *italic*, PRNDT bullace *P. domestica* subsp. *insititia*, PRNSN sloe *P. spinosa*, PRNSC Japanese plum *P. salicina*, PRNAV sweet cherry *P. avium*, PRNCE sour cherry *P. cerasus*

Pest		Crop: pome and stone fruit ^{b c}			
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
<u>Myzus persicae</u> MYZUPE,	Aphids	Peach <i>Prunus persica</i> PRNPS	Nectarine <i>P. persica</i> var. <i>nucipersica</i> (PRNPN) apricot <i>Prunus armeniaca</i> (PRNAR) almond <i>Prunus dulcis</i> (PRNDU)		Plum <i>Prunus domestica</i> PRNDO
<u>M. cerasi</u> MYZUCE,	Aphids	Cherry <i>Prunus avium</i> PRNAV	<i>Prunus cerasi</i> PRNCE		
<u>Brachycaudus prunicola</u> APPEPR, <u>Hyalopterus pruni</u> HYALPR	Aphids Extrapolation on <i>Phorodon humuli</i> not possible	Plum <i>Prunus domestica</i> PRNDO	Damson <i>Prunus damascena</i> PRNDD	Almonds	

Pest			Crop: pome and stone fruit ^{b c}		
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
desirable					
<i>Pseudaulacaspis pentagona</i> PSEAPE, <i>Parthenolecanium corni</i> LECACO, <i>Eulecanium tiliae</i> LECATI	soft scales Coccidae	Peach	Apricot, nectarine, almond	Other relevant crops	Kiwi
<i>Thrips meridionalis</i> THRIME <i>Frankliniella occidentalis</i> FRANOC S	Thrips	Peach	Pome or stone fruit		
<i>Metcalfa pruinosa</i> METFPR	Hoppers	Peach	Pome and Stone fruit	Apple, pear	ornamental trees
<i>Aculus schlechtendali</i> VASASD,	Rust mites	Plum	Pome fruit and plum		Ornamental trees, Raspberries (because of <i>Phyllocoptes gracilis</i>)

Pest			Crop: pome and stone fruit ^{b c}		
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
<i>Aculus fockeui</i> VASAFL, <i>Phyllocoptes gracillis</i> ACEIGR					
<i>Epitrimerus pyri</i> EPITPI, <i>Eriophyes pyri</i> ERPHPI, <i>Eriophyes similis</i> ERPHSI	Gall mites Eriophyidae	Plum	Pome fruit and plum		Ornamental trees Raspberries (because of <i>Phyllocoptes gracillis</i>)
<i>Panonychus ulmi</i> METTUL, <i>Tetranychus urticae</i> TETRUR, <i>T. viennensis</i> TETRVI, <i>Bryobia rubricolus</i> BRYORU	Spider mites	Peach	Stone and pome fruit	citrus fruit	Other relevant crops
<i>Adoxophyes orana</i> CAPURE and one of the following:	Tortricidae (Leaf roller moths)	Peach	Pome and stone fruit	Any other pome or stone fruit	ornamental trees

Pest			Crop: pome and stone fruit ^{b c}		
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
<i>Cacoecia podana</i> CACOPO, <i>Cacoecia rosana</i> CACORO, <i>Pandemis heparana</i> PANDHE, <i>Argyroplote variegana</i> ARGPVA, <i>Cacoecia costana</i> CACOCO, <i>Enarmonia formosana</i> ENARFO, <i>Argyroplote pruniana</i> ARGPPR, <i>Tmetocera ocellana</i> TMETOC, <i>Hedya nubiferana</i> ARGPVA					
<i>Cydia funebrana</i>	Tortricidae (leaf roller)	plum	Damsons all subspecies of		

Pest			Crop: pome and stone fruit ^{b c}		
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
LASPFU	moths)		P. domestica		
Data on any two of: <i>Lyonetia clerkella</i>	Leaf miners	Any relevant stone fruit	Pome or stone fruit		
LYONCL, <i>Phyllonorycter blancardella</i> LITHBL , <i>P. corylifoliella</i> PRYCCO, <i>Leucoptera malifoliella</i> LEUCSC, <i>Stigmella malella</i> NEPTMA					
<i>Anarsia lineatella</i> ANARLI	Stem borers	peach	Stone fruit	Any other stone fruit	
<i>Orthosia</i> spp. ORTOSP	Noctuids	Cherry or plum	Pome and stone fruit	ornamental shrubs	
<i>Operophtera brumata</i> CHEIB R	Winter moths Geometridae	Cherry or plum	Pome and stone fruit	ornamental shrubs	

Pest			Crop: pome and stone fruit ^{b c}		
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
<i>Orgyia antiqua</i> ORGYAN	Lymantriidae	Cherry or plum	Pome and stone fruit	ornamental shrubs	
Data on any two of: <i>Hoplocampa testudinea</i> HOPLTE, <i>Taxonus glabratus</i> TAXOGL, <i>Hoplocampa flava</i> HOPLFL, <i>Hoplocampa spp.</i> , HOPLSP, <i>H. Brevis</i> HOPLBR, <i>Eriocampoides limacina</i> ERICLI	Sawflies	Any relevant stone fruit	Pome or stone fruit		
<i>Ceratitis capitata</i> CERTCA	Fruit flies	Peach	Pome and stone fruit,	Citrus	Kiwi*
<i>Chinavia hilare</i>	Green stink bugs	Peach	Pome and stone fruit		
<i>Rhagoletis cerasi</i>	Fruit flies	Cherry			

Pest			Crop: pome and stone fruit ^{b c}		
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
RHAGCE <i>Peritelus sphaeroides</i> PERESH, <i>Polydrusus</i> <i>spp</i> POLOSP, <i>Phyllobius spp</i> PLL BSP, <i>Otiorrhynchus impressiventris</i> , <i>Byctiscus betulae</i> BYCTBE	Weevils (leaf-eaters)	Any stone fruit	Pome or stone fruit		
<i>Rhynchites coeruleus</i> RNCHCA, <i>Rhynchites pauxillus</i> COENPA	Weevils (buds-damaging)	Any stone fruit	Pome or stone fruit		
<i>Rhynchites bacchus</i> RNCHBA, <i>Rhynchites aequatus</i> COENAQ, <i>Furcipes rectirostris</i> ANTHRE	Weevils (fruit damaging)	Any stone fruit	Pome or stone fruit		

Pest		Crop: pome and stone fruit ^{b c}			
^{1 d} Pest species	² Extrapolation to pest group	^{3 e} Indicator crops	⁴ Extrapolation to other crops	^{5 f} Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	^{6 g} Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
<i>Capnodis tenebrionis</i>	Buprestidae	apricot	peach		
<i>Thaumatotibia roerigii</i>	False codling moth	Cherry or plum or peach	Any relevant stone fruit		
<i>Helicoverpa armigera</i>	Cotton bollworm	Cherry or peach or plum or apricot	Any relevant stone fruit		
<i>Dysdercus suturellus</i>	Cotton stainer	Any relevant stone fruit	Any relevant stone fruit		
<i>Spodoptera spp</i>	Armyworm	Peach or cherry	Any relevant stone fruit		
<i>Meloidoyne spp</i> <i>Mesocriconema spp</i> <i>Pratylenchus vulnus</i> <i>Xiphinema americanum</i>	Nematodes	Plums, apricots, peach	All relevany		

Table 8. PESTS AND NEMATODES ON POME FRUIT

MABSD apple *Malus x domestica*, PYUCO pear *Pyrus communis*, CYDOB quince *Cydonia oblonga*, MABSY crab-apple *Malus sylvestris*,
 EIOJA loquat *Eryobotria japonica*, MSPGE medlar *Mespilus germanica*, PYUPC Nashi pear *Pyrus pyrifolia* var. *culta*, ABOME black chokeberry
Aronia melanocarpa, SOUSS mountain ash *Sorbus* sp.

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Dysaphis plantaginea</i> DYSAP L. <i>Dysaphis</i> sp. DYSASP (no extrapolation to <i>Aphis spiraecola</i> APHISI, a less sensitive species)	Aphids	Apple MABSD	Pome fruit		Ornamentals Other ornamental <i>Malus</i> sp.* Tree nuts, Berries (<i>Rubus</i> sp. RUBSS and <i>Ribes</i> sp. RIBSS), Citrus
<i>Eriosoma lanigerum</i> ERISLA	Woolly aphids	Apple MABSD	Pome fruit		
<i>Phenacoccus aceris</i> PHENAC	Mealybugs	Apple MABSD	Pome fruits		Cane and bush fruits (<i>Rubus</i> sp. RUBSS, <i>Ribes</i>

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*) <i>sp. RIBSS, Vaccinium sp. VACSS</i>), Woody ornamentals
<i>Cacopsylla pyricola</i> PSYLPC or <i>Cacopsylla pyri</i> PSYLP	Psyllids (virus/phytoplasma transmitting should be tested separately)	Pear PYUCO or Apple MABSD	Pome fruit		
<i>Lepidosaphes ulmi</i> LEPSU L, <i>Quadraspidiotus ostreaeformis</i> (=Q. <i>ostreiformis</i>) QUADOS, <i>Quadraspidiotus perniciosus</i> QUADPE, <i>Quadraspidiotus pyri</i> QUADPY,	Armored scales <i>Diaspididae</i>	Apple MABSD	Pome fruit	Other host crops in which this pest occurs*	Peach PRNPS (Northern Europe only) Other host crops in which this pest occurs*

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
<i>Epidiaspis leperii</i> EPIDBE (Time of treatment / stage of development is very important)					
<i>Pseudaulacaspis pentagona</i> PSEAPE, <i>Parthenolecanium corni</i> LECACO, <i>Eulecanium tiliae</i> LECATI	Soft scales <i>Coccidae</i>	Apple MABSD	Other relevant pome fruit	Other host crops in which this pest occurs	Kiwi ATIDE Woody ornamentals
<i>Lygocoris pabulinus</i> LYGUPA, <i>Campylomma verbasci</i> CAMYVE, <i>Lygus</i> sp. LYGUSP, <i>Calocoris</i> sp. CLCRSP, <i>Plesiocoris rugicollis</i> PLESRU	Capsids /Bugs	Apple MABSD	Pome fruit		
<i>Stictocephala</i> sp. STICSP, <i>Edwardsiana crataegi</i>	Hoppers	Apple MABSD or Pear PYUCO	Pome fruit		

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
(=Edwardsiana frogatti) TYCYFR					
<i>Dasineura mali</i> DASYMA, <i>Dasineura pyri</i> DASYPY	Leaf Midges	Apple MABSD or Pear PYUCO	Pome fruit		
<i>Contarinia pyrivora</i> CONTPY	Gall midges	Pear PYUCO			
<i>Aculus schlechtendali</i> VASASD, <i>Aculus fockeu</i> VASAF L, <i>Phyllocoptes gracilis</i> ACEIGR	Rust mites	Apple MABSD or Pear PYUCO	Pome fruit		Plum PRNDO Ornamental trees Raspberries RUBID (because of <i>Phyllocoptes gracilis</i>)
<i>Epirimerus pyri</i> EPITPI, <i>Eriophyes pyri</i> ERPHPI, <i>Eriophyes similis</i> ERPHSI	Gall mites <i>Eriophyidae</i>	Apple MABSD or Pear PYUCO	Pome fruit		Plum PRNDO Ornamental trees Raspberries (because of

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*) <i>Phyllocoptes gracillis</i>
<u><i>Panonychus ulmi</i></u> METTUL, <u><i>Tetranychus urticae</i></u> TETRUR, <i>T. viennensis</i> TETRVI, <i>Bryobia rubricolus</i> BRYORU	Spider mites	Apple MABSD	Pome fruit	Citrus fruit	Stone fruit Other relevant crops
<u><i>Adoxophyes orana</i></u> CAPURE and of the following: <i>Archips podana</i> (=Cacoecia podana) CACOPO, <i>Archips rosanus</i> (=Cacoecia rosana) CACORO, <i>Pandemis heparana</i> PANDHE, <i>Hedya dimidioalba</i> (=Argyroplote variegana, <i>Hedya nubiferana</i>) ARGPVA, <i>Clepsis spectrana</i> (=Cacoecia costana)	<i>Tortricidae</i> (Leaf roller moths)	Apple MABSD or Any other pome fruit	Pome fruit	Any other stone fruit	Stone fruit Ornamental trees

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
CACOCO, <i>Enarmonia formosana</i> ENARFO,					

5					
<i>Hedya pruniana</i> (=Argyroplote pruniana) ARGPPR, <i>Spilonota ocellana</i> (=Tmetocera ocellana) TMETOC					
<i>Cydia pomonella</i> CARPPO, <i>Grapholita molesta</i> LASPMO	Tortricidae (leaf roller moths)	Apple MABSD	Pome fruit		Plum PRNDO, Apricot PRNAR, Walnut IUGRE
<i>Yponomeuta malinella</i> HYPNMA, <i>Argyresthia conjugella</i> ARGYCO	Yponomeutidae (Ermine moths)	Apple MABDS			Woody ornamentals
Data on any two of: <i>Lyonetia clerkella</i> LYONCL, <i>Phyllonorycter</i>	Leaf miners	Any relevant pome fruit	Pome fruit		Stone fruit Woody ornamentals

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
<i>blancardella</i> LITHBL , <i>P.</i> <i>corylifoliella</i> PRYCCO, <i>Leucoptera malifoliella</i> LEUCSC, <i>Stigmella malella</i> NEPTMA					
<i>Zeuzera pyrina</i> ZEUPPY, <i>Cossus cossus</i> COSSCO, <i>Synanthedon myopaeformis</i> SYNAMY	Wood borers	Apple MABSD	Pome fruit		Stone fruit Woody ornamentals
<i>Orthosia</i> sp. ORTOSP	Noctuids	Apple MABSD or Pear PYUCO	Pome fruit	Ornamental shrubs	Stone fruit
<i>Orgyia antiqua</i> ORGYAN	<i>Lymantriidae</i>	Apple MABSD or Pear PYUCO	Pome fruit	Ornamental shrubs	Stone fruit
Data on any two of: <i>Hoplocampa testudinea</i> HOPLTE, <i>Taxonus</i>	Sawflies	Any relevant pome fruit	Pome fruit		Stone fruit

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
<i>glabratus</i> TAXOGL, <i>Hoplocampa flava</i> HOPLFL, <i>Hoplocampa</i> sp. HOPLSP, <i>H. Brevis</i> HOPLBR, <i>Caliroa cerasi</i> (=Eriocampoides limacine) ERICLI					
<i>Ceratitis capitata</i> CERTCA	Fruit flies	Apple MABSD	Pome fruit	Citrus	Stone fruit Kiwi ATIDE*
<i>Peritelus sphaeroides</i> PERESH, <i>Polydrusus</i> sp POLOSP, <i>Phyllobius</i> sp PLLBSP, <i>Otiorhynchus impressiventris</i> OTIOIM, <i>Byctiscus betulae</i> BYCTBE	Weevils (leaf-eaters)	Any pome fruit	Pome fruit		Stone fruit
<i>Rhynchites coeruleus</i> RNCHCA, <i>Rhynchites</i>	Weevils (bud-damaging)	Any pome fruit	Pome fruit		Stone fruit

Pests		Crops: within Pome Fruit		Crops: outside Pome Fruit	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
<i>pauxillus</i> COENPA					
<i>Rhynchites bacchus</i> RNCHBA, <i>Rhynchites aequatus</i> COENAQ, <i>Furcipes rectirostris</i> ANTHRE	Weevils (fruit damaging)	Any pome fruit	Pome fruit		Stone fruit
<i>Anisandrus dispar</i>	Scolytidae (Ambrosia beetles)	Apple MABSD			Stone fruit, Woody ornamentals, Nut trees
XYLBDI					
<i>Pratylenchus spp</i> <i>Xiphinema spp</i> <i>Meloidogyne spp</i>	Nematodes	Apple MABSD or Pear PYUCO	Any relevant pome fruit		

Table. 9. PESTS AND NEMATODES ON TREE NUTS

PRNDU sweet almond *Prunus dulcis*, CYLAV hazelnut *Corylus avellana*, IUGRE walnut *Juglans regia*, CSNSA sweet chestnut *Castanea sativa*, PIAVE pistachio *Pistacia vera*, Macadamia nuts *Macadamia integrifolia*, Cashew nuts *Anacardium occidentale*, coconut *Cocos nucifera*

Pest		Crops: within the tree nuts		Crops: outside the tree nuts	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Paracoccus spp</i> <i>Pseudococcus longispinus</i>	Mealybugs	Coconut or Macadamia	Any relevant tree nuts		
<i>Coptotermes formosanus</i> <i>Terminalia catappa</i>	Termites	Coconut or almond or macadamia	Any relevant tree nut		
<i>Pseudotheraptus wayi</i>	Coconut bug	Coconut or macadamia or cashew nut	Any relevant tree nut		
<i>Oryctes monoceros</i>	African rhinoceros beetle	Coconut			
<i>Eriophyes guerreronis</i>	Coconut mite Aceria	Coconut			
<i>Aspidiotus destructor</i>	Coconut scale	Coconut			
<i>Rhynchophorus phoenicis</i> <i>Mecicorynus loripes</i>	weevils	Coconut, cashew nuts	Any relevant tree nuts		

Pest		Crops: within the tree nuts		Crops: outside the tree nuts	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Omiodes blackburni</i>	Coconut leafroller	Coconut			
<i>Hypothenemus obscurus</i> <i>Cryptophlebia ombrodelta</i>	nut borer	Macadamia			
<i>Nezara viridula</i>	Stink bug	macadamia			
<i>scirtothrips spp</i> <i>Selenothrips rubrocinctus</i>	thrips	Macadamia or cashew nuts	Any relevant tree nuts		
<i>Helopeltis schoutedeni</i>	Helopeltis bugs	Cashew nuts			
<i>Myzocallis castanicola</i> MYZCCS, <i>Lachnus roboris</i> LACNRO	Aphid ^a	sweet chestnut CSNSA	Tree nuts	Stone fruit*, pome fruit*	
<i>Chromaphis juglandicola</i> CHRAJU, <i>Callaphis juglandis</i> CLLAJU		common walnut IUGRE			
<i>Hyalopterus pruni</i> HYALPR, <i>Brachycaudus amygdalinus</i> = <i>Anuraphis amygdalinus</i> = <i>Aphis amygdalinus</i> BRDSAM,		sweet almond PRNDU			

Pest		Crops: within the tree nuts		Crops: outside the tree nuts	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Brachycaudus persicae</i> ANURPN,					
<i>Myzocallis coryli</i> MYZCCO, <i>Corylobium avellanae</i> CRLOAV		common hazelnut CYLAV			
<i>Pratylenchus spp</i> <i>Xiphinema spp</i> <i>Meloidogyne spp</i> <i>Bursaphelenchus spp</i>	Nematodes				
		Walnut or coconut or macadamia	All relevant tree nuts		

c. CROP SAFETY EXTRAPOLATION FOR FUNGICIDES AND INSECTICIDES ON FRUITS AND TREE NUTS

Phytotoxicity is particularly relevant to certain plant protection products, some types of applications and for specific crops. It can vary considerably between different crop species, cultivars of the same crop, and between different plant protection products. Fruits and tree nuts may have different growth characteristics, canopy sizes and GAPs from the representative indicator crops in the efficacy tables. Crop safety extrapolation is possible in some situations, but should be well reasoned. Extrapolation may not be possible where use of a product has resulted in crop damage on some crops or cultivars where the crops concerned are significantly different, or when a crop is known to be particularly sensitive. The following principles are important to consider;

1. Method of application should be similar.
2. Availability and interpretation of evidence of crop safety.
3. Taxonomic relationship and similarity in morphology.
4. Availability of adequate crop safety data showing a good margin of safety in fruits and tree nuts.

Below are a few extrapolation tables for crop safety in fruits. The extrapolation tables should be used in conjunction with efficacy extrapolation guidelines. The tables provide detailed lists of acceptable extrapolations organized by crop groups for the regulatory authority and applicants in the context of the registration of plant protection products for minor uses. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. The regulatory authority excludes liability as to the reliability of the information provided through these tables.

For seed treatments, indicator crops should include seeds of similar or smaller size and a germination test on the indicator crop is usually necessary. Specific trials with insecticides and fungicides are not essential for foliar application. Observations in efficacy or residue trials are usually acceptable.

Table 1. POME FRUIT

Treatment type		Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Wound treatment		a			
Foliar treatment					
Soil treatment		Apple and Pear ^a	All pome fruit		

Table 2. STONE FRUIT

Treatment type		Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Wound treatment		a			
Foliar treatment					
Soil treatment		Peach AND Plum AND Cherry ^a	All stone fruit	Apricot, Almond, Nectarine	

d. EXTRAPOLATION TABLES for EFFECTIVENESS of HERBICIDES

INTRODUCTION

The table provides detailed lists of acceptable extrapolations organized by crop groups, for regulatory authorities and applicants, in the context of the registration of plant protection products for minor uses. The table should be used in conjunction with the EPPO Standard PP1/257- Efficacy and crop safety extrapolations for minor uses. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. EPPO excludes liability as to the reliability of the information provided through these tables.

The scope for extrapolation may be extended as data and experience with a certain plant protection products increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of target biology may be a relevant factor, either in extrapolating to other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure etc. should be considered.

TABLE FORMAT

The main pest species for the crop group are listed in Column 1 (although this is not exhaustive), and the pest group to which they belong is specified in Column 2. Companies may choose if they wish to provide data only for individual named species, which would then appear individually listed on the label. But underlined species have been identified as key major targets and as such it is advisable to generate data on these. Furthermore, data on these species then allow a claim to be made for the whole pest group (as specified in Column 2), if required. If a claim for the whole pest group is required but there is no underlined species, then data should be generated on all listed species. Extrapolation from one weed species to other weed species is generally not possible, because of the differences in the sensitivity of weed species to a herbicide. Therefore, columns 1 and 2 remain blank.

Column 3 indicates the key indicator crop(s) for the crop group. In some instances this may be only one specified crop. In other cases, when separated by an 'or', the company may choose from a range of alternatives within the group. Data generated on crops in Column 3 may be used to extrapolate to all crops listed in Column 4. However, it is preferable to have data on several of the crops within the crop group, but data on the indicator crop should be available. In general it does not matter for the extrapolation which crop is taken in order to test the effect, as long as the application moment, cultivation time, soil coverage by crop, weeds etc. between the crops are comparable. For soil herbicides the soil type is also an important factor

Key notes: ^aFor the purpose of this extrapolation table, ‘bush fruits’ are defined as: currants (e.g. white, red, black, gooseberry) and berries (e.g. blackberry, raspberry, blueberry, cranberry, bilberry)

Column 5 identifies whether data on other crops against the same target may help to reduce the amount of required data on the indicator crop. It may be possible for a direct extrapolation without the need for further data on the indicator crop (marked with an asterisk (*)). However, this is dependent on the extent of available data and similarity of crop/target biology. The company should provide an appropriate reasoned case when wanting to use supporting data from other crop groups.

Column 6 gives examples of acceptable extrapolations for a particular pest claim onto other minor use crops. This is not a comprehensive list. Whether extrapolation may be direct (no data, marked with an asterisk (*)), or require additional supporting data on the minor use crop, will again be dependent on the extent and relevance of the existing database and companies should provide an appropriate reasoned case. If the crop is considered to be a major crop in some countries then it may not be appropriate to include in this column, and further data would be required. Companies will need to justify the status of the major crop/minor use.

The scope for extrapolation may be extended as data and experience with a certain plant protection products increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of target biology may be a relevant factor, either in extrapolating to other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure etc. should be considered.

CROP SAFETY EXTRAPOLATIONS FOR HERBICIDES

Crop safety is particularly an issue in the case of herbicides. Specific principles are not available and extrapolations have to be considered on a case-by-case basis. If a herbicide is demonstrated as only effective against monocotyledonous species, it may be possible to extrapolate crop safety between dicotyledonous crops, and vice versa. However, this will depend on the information available on the active substance on sensitivity of crop or even the variety within a given crop.

Table 1. WEEDS IN BUSH BERRIES

RIBRU red and white currants *Ribes rubrum*, **RIBNI** black currant *Ribes nigrum*, **RIBUC** gooseberry *Ribes uva-crispa*, **RUBID** raspberry *Rubus idaeus*, **VACMY** blackberry, blueberry and bilberry *Vaccinium myrtillus*, **VACSS** Cranberry *Vaccinium sp.* , **MORAL** Mulberry (*Morus alba*)

Weed		Crop: within Bush Fruits		Crop: outside Bush Fruits	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Common purslane (<i>Portulaca oleracea</i>) , <i>Polygonium spp</i> Double thorn (<i>Oxygonum sinuatum</i>), Starbur (<i>Acanthospermum hispidum</i>) Devil's thorn (<i>Emex australis</i>) Amaranthus (<i>Amaranthus retroflexus</i>), Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Cleavers (<i>Galium spurium</i>) Chick weed (<i>Stellaria media</i>) Pigweed (<i>Amaranthus spp</i>), Wandering Jew (<i>Commelina benghalensis</i>), Nightshades (<i>Chinese lantern</i>),	Dicotyledon	Goose berry Raspberry Blue berry Currants	All bush berry (fruit) crops	Pome fruits (Pears, Apples), tree nuts (Macademia nuts, citrus, olives	Pome fruits, tree nuts, citrus, olives

Weed		Crop: within Bush Fruits		Crop: outside Bush Fruits	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Mexican marigold (<i>Tagetes minuta</i>), Asthma weed (<i>Conyza bonaliensis</i>), Sodom apple (<i>Datura stramonium</i>), Lion's ear (<i>Leonotis leonurus</i> (L.)) Goose grass (<i>Eleusine indica</i>) <u>African love grass</u> (<i>Setaria verticillata</i>), Barnyard grass (<i>Echinochloa crusgalli</i>), couch grass (<i>digitaria abbyssinica</i>), Johnson's grass (<i>Sorghum halepense</i>), Sateria spp. (<i>Sateria pumila</i>), Bermuda grass (<i>Cynodon dactyalon</i>), Rhodes grass (<i>Chloris gayana</i>), crab grass (<i>Digitaria sanguinalis</i>), Brome (<i>Bromus tectorum</i>) Ryegrass (<i>Lolium</i>) Nutsedge (<i>Cyperus spp</i>)	Monocotyledons Sedges				

Table 2. WEEDS IN POME FRUIT

MABSD apple *Malus domestica*, **PYUCO pear** *Pyrus communis*, **CYDOB quince** *Cydonia oblonga*, **MABSY crab-apple** *Malus sylvestris*, **EIOJA loquat** *Eryobotria japonica*, **MSPGE medlar** *Mespilus germanica*, **PYUPC Nashi pear** *Pyrus pyrifolia* var. *culta*, **ABOME black chokeberry** *Aronia melanocarpa*, **SOUSS mountain ash** *Sorbus* sp.

Weed		Crop: within Pome Fruit		Crop: outside Pome Fruit	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
White Goose foot or fat hen (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , Oxalis (<i>Oxalis</i> spp) Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium</i> spp) Common Purslane (<i>Portulaca oleracea</i> , <i>Polygonium</i> spp) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Amaranthus (<i>Amaranthus retroflexus</i>),	Dicotyledon	Apple MABSS or pear PYUSS Loquarts	Any pome fruit crop Pear, Apple, Loquarts, Black choke berry,	All fruit* and grapevines* VITVI	Bush (Gooseberry, blue berry, raspberry) and cane fruit

Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Pigweed (<i>Amaranthus spp</i>), Wandering Jew, Chinese lantern, Mexican marigold, Horse weed, Sodom apple, Lion's ear					
Goose grass (<i>Eleusine indica</i>) <u>African love grass</u>, (<i>Setaria verticilata</i>), Johnson's grass (<i>Sorghum halepense</i>), Sateria spp. (<i>Sateria pumila</i>), Bermuda grass (<i>Cynodon dactyalon</i>), Rhodes grass (<i>Chloris gayana</i>), crab grass (<i>Digitaria sanguinalis</i>), Brome (<i>Bromus tectorum</i>) Ryegrass (<i>Lolium</i>), Bracharia <i>spp</i>, Oat grass (<i>Avena fatua</i>)	Monocotyledons				
Nutsedge (<i>Cyperus rotundus</i>)	Sedges				

Table 3. WEEDS IN STONE FRUIT

PRNPS peach *Prunus persica* including PRNPN nectarine *P. persica* var. *nucipersica* (and similar hybrids), PRNAR apricot *P. armeniaca*, PRNDU almond *P. dulcis*, PRNDO plum *P. domestica*, PRNDD damson plum *P. damascene*, PRNDS Mirabelle *P. domestica* var. *syriaca*, PRNDI greengage (reine-claude) *P. domestica* subsp. *italic*, PRNDT bullace *P. domestica* subsp. *insititia*, PRNSN sloe *P. spinosa*, PRNSC Japanese plum *P. salicina*, PRNAV sweet cherry *P. avium*, PRNCE sour cherry *P. cerasus*

Weed		Crop: within Stone Fruit		Crop: outside Stone Fruit	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Fat hen (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , Oxalis (<i>Oxalis</i> spp) Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium</i> spp) Common purslane (<i>Portulaca oleracea</i> , <i>Polygonium</i> spp) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Amaranthus (<i>Amaranthus retroflexus</i>),	Dicotyledon	Plum, Cherry or Peach,	Any stone fruit (Peach, Appricot, Plum, Cherry)	All fruit* and grapevines*	Bush (Goose berry, Raspberry, and Blue berry) and cane fruit

Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Pigweed (<i>Amaranthus spp</i>), Wandering Jew, Chinese lantern, Mexican marigold, Horse weed, Sodom apple, Lion's ear					
Goose grass (<i>Eleusine indica</i>) <u>African love grass</u> , (<i>Setaria verticilata</i>), couch grass (<i>Digitaria abbysinnica</i>), Johnson's grass (<i>Sorghum halapense</i>), Foxtail <i>spp</i> , Bermuda grass, Star grass, <i>Panicum spp</i> , Bracharia <i>spp</i> , Rhodes grass, crab grass	Monocotyledons				
Nutsedge (<i>Cyperus spp</i>)	Sedges				

Table 4. WEEDS IN NUT TREES

PRNDU sweet almond *Prunus dulcis*, **CYLAV** hazelnut *Corylus avellana*, **IUGRE** walnut *Juglans regia*, **CSNSA** sweet chestnut *Castanea sativa*, **PIAVE** pistachio *Pistacia vera*, **MCDIN** Macadamia nuts (*Macadamia integrifolia*), **ANAO**C Cashew nuts (*Anacardium occidentale*), **COCNU** Coconut (*Cocos nucifera*),

Weed		Crop: within Nut Trees		Crop: outside Nut Trees	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Goose foot (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , Oxalis (<i>Oxalis latifolia</i>), Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium spp</i>) Common purslane (<i>Portulaca oleracea</i> , <i>Polygonium spp</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>)	Dicotyledon	Macadamia nuts, Almond	Any tree nut	Pome fruit*, citrus fruit, stone fruit*, olives	Pome fruit*, citrus fruit, stone fruit*, olives

Weed		Crop: within Nut Trees		Crop: outside Nut Trees	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Amaranthus (<i>Amaranthus retroflexus</i>), Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Pigweed (<i>Amaranthus spp</i>), Wandering Jew, Chinese lantern, Mexican marigold, Horse weed, Sodom apple, Lion's ear Stinging Nettle (<i>Urtica dioica</i>). Common mallow (<i>Malva sylvestris</i>) (<i>Malva neglecta</i>) Goose grass (<i>Eleusine indica</i>) <u>African love grass,</u>	Monocotyledons				

Weed		Crop: within Nut Trees		Crop: outside Nut Trees	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Setaria verticillata</i> , couch grass, Johnson's grass, Foxtail <i>spp</i> , Bermuda grass, Star grass, Pannicum <i>spp</i> , Bracharia <i>spp</i> , Rhodes grass, crab grass Nutsedge (<i>Cyperus spp</i>) Dodder (<i>Cascula campestris</i>), Ipomea (<i>Ipomea pupurea</i>) (<i>Convolvulus pupurea</i>) (<i>Parthenium hysterophorus</i>)	Sedges Invasive species				

Table 5. WEEDS IN CITRUS FRUIT

CIDPA Grapefruit *Citrus paradisi*, **CIDSI Orange** *Citrus sinensis*, **CIDLI Lemon** *Citrus limon*, **CIDAF Lime** *Citrus aurantifolia*, **CIDRE Mandarin** *Citrus reticulata sensu stricto*, **FOLMA** and **FOLJA Kumquats** *Fortunella margarita*, *F. japonica*

Weed		Crop: within Citrus Fruit		Crop: outside Citrus Fruit	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Bacon weed (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , <i>Oxalis</i> (<i>Oxalis spp</i>) Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium spp</i>) Common purslane (<i>Portulaca oleracea</i> , <i>Polygonium spp</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Amaranthus (<i>Amaranthus retroflexus</i>), Macdonald's eye (<i>Galinsoga parviflora</i>),	Dicotyledon	Orange	Any citrus fruit	Pome fruit*, Miscellaneous Fruit (Inedible Peel, Large)* stone fruit*, olives	Pome fruit*, Miscellaneous Fruit (Inedible Peel, Large)*, stone fruit*, olives

Weed		Crop: within Citrus Fruit		Crop: outside Citrus Fruit	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
(<i>Convolvulus arvensis</i>), Morningglory(<i>Ipomea sp</i>					

Table 6. WEEDS IN TROPICAL AND SUBTROPICAL FRUITS (EDIBLE PEEL)

Figs *Ficus carica* **FIUCA**, **Table olives** *Olea europaea* **OLVEU**, **Carambolas** *Averrhoa carambola* **AVRCA**, **Kaki** *Diospyros kaki* **DOSKA**, **Jamblus** *Syzygium cumini* **SYZCU**

Weed		Crop: within Tropical and Subtropical Fruits (Edible Peel)		Crop: Outside Tropical and Subtropical Fruits Fruit (Edible Peel)	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Bacon weed (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , Oxalis (<i>Oxalis spp</i>) Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium spp</i>) Common purslane (<i>Portulaca oleracea</i> , <i>Polygonium spp</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>)	Dicotyledon	Figs and Table Olives	Any Miscellaneous Fruit (Edible Peel)	Pome fruit*, citrus fruit, stone fruit*, olives	Pome fruit*, citrus fruit, stone fruit*, olives

Amaranthus (<i>Amaranthus retroflexus</i>), Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Pigweed (<i>Amaranthus spp</i>), Wandering Jew, Chinese lantern, Mexican marigold, Horse weed, Sodom apple, Lion's ear	Monocotyledons				
Goose grass (<i>Eleusine indica</i>) <u>African love grass</u>, Setaria verticillata, couch grass, Johnson's grass, Foxtail <i>spp</i>, Bermuda grass, Star grass, Panicum <i>spp</i>, Bracharia <i>spp</i>, Rhodes grass, crab grass, Rhodes grass, crab grass	Sedges				
Nutsedge (<i>Cyperus spp</i>)					

Table 7. WEEDS IN TROPICAL AND SUBTROPICAL FRUITS (INEDIBLE PEEL, LARGE)

Avocado *Persea americana* **PEBAM**, **Banana** *Musa acuminata* **MUBAC** *Musa balbisiana* **MUBBA**, **Mango** *Mangifera indica* **MNGIN**, **Papaya** *Carica papaya* **CIAPA**, **Pomegrenate** *Punica granatum* **PUNGR**, **Cherimoyas** *Annona cherimola* **ANUCH**, **Guavas** *Psidium guajava* **PSIGU**, **Pineapple** *Ananas comosus* **ANHCO**, **Breadfruit** *Artocarpus altilis* **ABFAL**, **Durian** *Durio zibethinus* **DURZI**, **Soursops** *Annona muricata* **ANUMU** *Annona sp.* **ANUSS**

Weed		Crop: within Tropical and Subtropical Fruits (Inedible Peel, Large)		Crop: outside Tropical and Subtropical Fruits (Inedible Peel, Large)	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Bacon weed (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , <i>Oxalis</i> (<i>Oxalis</i> spp) Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium</i> spp) Common purslane (<i>Portulaca oleracea</i> , <i>Polygonium</i> spp) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn	Dicotyledon	Avocado, Banana, Mango, Papaya and Pineapples	Any Miscellaneous Fruit (Inedible Peel, Large)	Kiwi *, citrus fruit, stone fruit*, Pome fruit* passion fruit* olives	Pome fruit*, citrus fruit, stone fruit*, olives

(<i>Emex australis</i>) Amaranthus (<i>Amaranthus retroflexus</i>), Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Pigweed (<i>Amaranthus spp</i>), Wandering Jew, Chinese lantern, Mexican marigold, Horse weed, Sodom apple, Lion's ear					
Goose grass (<i>Eleusine indica</i>) <u>African love grass</u>, Setaria verticillata, couch grass, Johnson's grass, Foxtail <i>spp</i>, Bermuda grass, Star grass, Panicum <i>spp</i>, Bracharia <i>spp</i>, Rhodes grass, crab grass	Monocotyledons				
Nutsedge (<i>Cyperus spp</i>)	Sedges				
Dodder (<i>Cuscuta campestris</i>), Bindweed (<i>Convolvulus arvensis</i>),	Invasive species				

Morning glory (<i>Ipomea</i> <i>spp.</i>)					
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Table 8. WEEDS IN TROPICAL AND SUBTROPICAL FRUITS (INEDIBLE PEEL, SMALL)

Kiwi *Actinidia deliciosa* **ATIDE** and *Actinidia chinensis* **ATICH**, **Litchis** *Litchi chinensis* **LIHCH**, **Passionfruit** *Passiflora edulis* **PAQED**, **Prickly pears** *Opuntia ficus-indica* **OPUFI**, **Star apples** *Chrysophyllum cainito* **CSFCA**, **American persimons** *Diospyros virginiana* **DOSVI**

Weed		Crop: within Tropical and Subtropical Fruits (Inedible Peel, Small)		Crop: outside Tropical and Subtropical Fruits (Inedible Peel, Small)	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Bacon weed (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , <i>Oxalis</i> (<i>Oxalis</i> spp) Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium</i> spp) Common purslane (<i>Portulaca oleracea</i> , <i>Polygonium</i> spp) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>)	Dicotyledon	Passion fruit	Any Miscellaneous Fruit (Inedible Peel, Small)	Miscellaneous Fruit (Inedible Peel, Large)*, citrus fruit*	Miscellaneous Fruit (Inedible Peel, Large)*, citrus fruit*

Amaranthus (<i>Amaranthus retroflexus</i>), Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Pigweed (<i>Amaranthus spp</i>), Wandering Jew, Chinese lantern, Chinese lantern, Mexican marigold, Horse weed, Sodom apple, Lion's ear Goose grass (<i>Eleusine indica</i>) <u>African love grass</u>, Setaria verticillata, couch grass, Johnson's grass, Foxtail <i>spp</i>, Bermuda grass, Star grass, Panicum <i>spp</i>, Bracharia <i>spp</i>, Rhodes grass, crab grass Nutsedge (<i>Cyperus spp</i>)	Monocotyledons Sedges Invasive weeds				
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Bindweed (<i>Convolvulus arvensis</i>), Morning glory (<i>Ipomea spp.</i>)					
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Table 9. WEEDS IN STRAWBERRIES

Weed		Crop: within Strawberries		Crop: outside Strawberries	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Bacon weed (<i>Chenopodium album</i>), Willow herb (<i>Epilobium ciliatum</i>) Nightshade (<i>Solanum nigrum</i> , Oxalis (<i>Oxalis spp</i>) Thistles (<i>Cirsium arvense</i>) African clover (<i>Trifolium spp</i>) Common purslane (<i>Portulaca oleracea</i> , <i>Polygonium spp</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Amaranthus (<i>Amaranthus retroflexus</i>),	Dicotyledon	Strawberries	Any Bush berries (raspberry, currants), any varieties of strawberries	Bush berries*, citrus fruit, Tomatoes* Pineapples* Onion*	Bush berries*, citrus fruit, Tomatoes* Pineapples* Onion*

Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>) Sowthistle (<i>Sonchus eraceae</i>), Pigweed (<i>Amaranthus spp</i>), Wandering Jew, Chinese lantern, Chinese lantern, Mexican marigold, Horse weed, Sodom apple, Lion's ear					
Goose grass (<i>Eleusine indica</i>) <u>African love grass</u> , <i>Setaria verticilata</i> , couch grass, Johnson's grass, Foxtail <i>spp</i> , Bermuda grass, Star grass, Panicum <i>spp</i> , Bracharia <i>spp</i> , Rhodes grass, crab grass	Monocotyledons				
Nutsedge (<i>Cyperus spp</i>)	Sedges				

Table 4: DISEASES ON UMBELLIFEROUS CROPS:

DAUCA Carrot *Daucus carota*, APUGV Celery *Apium graveolens* and APUGR Celeriac *Apium graveolens* var. *rapaceum*, FOEVD Fennel *Foeniculum vulgare* var. *dulce*, PAVSA Parsnip *Pastinaca sativa*, PARCR Parsley *Petroselinum crispum*, CORSA Coriander *Coriandrum sativum*, CRYCA Caraway *Caraway*

Pests		Crops: within the Umbelliferae		Crops: outside the Umbelliferae	
1	2	3	4	5	6
Pathogen species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u>Alternaria dauci</u> ALTEDA; <i>Alternaria radicina</i> ALTERA <i>Alternaria</i> sp. ALTESP	Leaf spot/blight	Carrot DAUCA	To all umbelliferous	Host crops of <i>Alternaria</i> sp	Herbs Salsify TROPS Crops for seed production
<i>Cercospora carotae</i> , CERCCA					

<i>Pythium</i> sp. PYTHSP	Cavity spot	DAUCA Carrot <i>Daucus carota</i> or CORSA Coriander <i>Coriandrum sativum</i> or PARCR Parsley <i>Petroselinum crispum</i>	To all umbelliferous		
<i>Stemphylium</i> sp. STEMSP	Leaf blight	carrot DAUCA	Fennel, Celeriac, APUGR	Asparagus ASPSS	
<i>Helicobasidium brebissonii</i> , HLCBBR	Violet root rot	Carrot DAUCA	To all umbelliferous		
<i>Rhizoctonia carotae</i> , RHIZCA	Storage disease	Any umbelliferous	To all umbelliferous		
<i>Erysiphe heraclei</i> , ERYSH	Powdery mildew	Any umbelliferous	To all umbelliferous	Cucumber CUMSA	Black salsify SCVHI Herbs
<i>Mycocentrospora acerina</i> , MYCCAC		Carrot DAUCA	To all umbelliferous		
<i>Phytophthora</i> sp. PHYTSP	Ring rot	Any umbelliferous	To all umbelliferous		

<i>Phoma</i> sp. PHOMSP		Any umbelliferous	To all umbelliferous	Leafy vegetables	
<i>Plasmopara crustosa</i> <i>umbrelliferarum</i> PLASCR, <i>Peronospora</i> sp. PEROSP	Downy Mildew	Fennel FOESS Parsley PARCR	To all umbelliferous		
<i>Septoria</i> sp SEPTSP	Septoria leaf spot disease	Any umbelliferous (except carrot DAUCA)	To all umbelliferous		
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests					
<i>Pythium violae</i> , PYTHVI		Carrot DAUCA	Fennel FOESS, Celeriac APUGR	Any other crop*	
<i>Botryotinia fuckeliana</i> , BOTRCI		Celeriac APUGR	Fennel FOESS, Celeriac APUGR	Any other crop*	
<i>Pythium</i> PYTHSP, <i>Rhizoctonia</i> RHIZSP, <i>Phytophthora</i> PHYTSP, <i>Fusarium</i> FUSASP	Damping-off diseases	Carrot DAUCA		Spinach SPQOL, Sugarbeet BEAVA	Herbs
<i>Sclerotinia sclerotiorum</i> , SCLESC	White mould	Carrot DAUCA	Fennel FOESS, Celeriac APUGR Parsley PARSS		

<i>Thanatephorus cucumeris</i> , RHIZSO/ RHIZSP, <i>Rhizoctonia</i>	Crown and root rot	Carrot DAUCA		Lettuce LACSA, Brassica 1BRSG	
<i>Streptomyces scabiei</i> , STRESC	potato scab	Carrot DAUCA		Potato SOLTU	
<i>Xanthomonas hortorum</i> pv. <i>Carotae</i> , XANTCR	bacterial leaf blight	Carrot DAUCA	Fennel FOESS, Celeriac APUGR		

Table 5: DISEASES ON CUCURBITACEAE

CUMSC Cucumber *Cucumis sativus*, CUUPG Courgette *Cucurbita pepo* var. *giromontiina* (including zucchini and marrow squash), CUUPE Marrow *Cucurbita maxima* (Squash and pattypan/scallop squash and gourds), CUUPM Pumpkin *Cucurbita pepo* var. *melopepo*, CUMME Melon *Cucumis melo*, CITLA Water Melon *Citrullus lanatus*, Thorn melon (*Cucumis metuliferus*), Karela (*Momordica charantia*), Butter nut squash (*Cucurbita moschata*)

Pest		Crop: within the Cucurbitaceae		Crops: outside Cucurbitaceae	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Pyrenochaeta lycopersici</i> PYRELY	Root rot	Water Melon CUMME	All crops within the group	Tomato LYPES, Potato SOLTU	Tomato LYPES
<i>Pseudoperonospora cubensis</i> PSPECU	Downy mildew	Cucumber CUMSC or water Melon CUMME	All crops within the group		Basil OCIBA, Sage SALSS, Herbs

<i>Alternaria</i> spp. ALTESP <i>A. cucumerina</i> ALTECU	Leaf blight	Cucumber CUMSC or water Melon CITLA	All crops within the group	Strawberry FRASS, Tomato LYPES	Auberginesolme, Turnip BRSRR , Scorzonera 1SCVG, Wild Lettuce LACSE, Endive CICEN, Chicory CICIN, Fennel FOESS, Sweet Pepper CPSAN, Umbelliferous Herbs
<i>Cladosporium</i> spp. CLADSP	Scab	Cucumber CUMSC or water Melon CITLA,	All crops within the group	Tomato LYPES	Spinach BEAVV
<i>Erysiphe</i> spp. ERYSSP, <i>Golovinomyces</i> <i>cichoracearum</i> ERYSCI or ⁱ <i>Sphaerotheca</i> spp. SPHRSP, <i>Sphaerotheca fuliginea</i> SPHRFU	Powdery mildew	Water Melon CITLA or Cucumber CUMSC	All crops within the group	Tobacco NIOTA	Endive CICEN, Lambs lettuce VLLLO, Chicory CICIN, Tobacco NIOSS, Parsley PARSS
<i>Didymella bryoniae</i> DIDYBR	Gummy stem blight Black stem rot	Water Melon CITLA or Cucumber CUMSC	All crops within the group	Cabbage BRSOL, Raspberry RUBID	

<i>Colletotrichum</i> spp. COLLSP	Anthrachnose	Water Melon CITLA or Cucumber CUMSC	All crops within the group	Tomato LYPES, Beans PHSSS	Spinach SPQOL, Sweet pepper CPSAN, Beans PHSSS, Peas PIBSS
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests					
<i>Fusarium oxysporum</i>	Fusarium wilt	Water Melon CITLA	All crops within the group	tomato LYPES	Tomato LYPES, Carnations
<i>Fusarium oxysporum</i> f.sp. <i>radicis- cucumerinum</i> FUSARC	Fusarium crown and stem rot	Cucumber CUMSC	All crops within the group	tomato LYPES, asparagus	Sweet basil OCIBA, Tomato LYPES
<i>Verticillium</i> spp. VERTSP	Verticillium wilt	Cucumber CUMSC or water melon CITLA or zucchini CUUPG	All crops within the group	tomato LYPES, potato SOLTU, strawberry FRASS, sunflower HELAN, cotton GOSHI	chrysanthemu m 1CHYG, pelargonium 1PELG, Tomato LYPES, Tobacco NIOSS

<i>Botrytis</i> spp. BOTRSP, <i>Botrytis cinerea</i> BOTRCI	Grey mould	cucumber CUMSC or water melon CITLA	All crops within the group	tomato LYPES, strawberry FRASS, fabaceae 1LEGF, eggplant SOLME, sweet pepper CPSAN, chilli pepper CPSFR	chrysanthemum 1CHYG, begonia, pelargonium PELSS, Tomato LYPES, Lettuce LACSS, Beans PHSSS, peas, Basil OCIBA, rosmarin RMSS
<i>Pythium</i> spp. PYTHSP	Damping off/root rot	cucumber CUMSC	All crops within the group	Most vegetable crops are susceptible	susceptible minor vegetable crops, Tomato LYPES, Lettuce LACSS, Spinach BEAVV

<i>Rhizoctonia solani</i> RHIZSO	Damping off/root rot	Water melon CITLA or cucumber CUMSC	All crops within the group	Most vegetable crops are susceptible, strawberry FRASS, tobacco NIOTA, potato SOLTU	begonia BEGSS, chrysanthemu m 1CHYG, saintpaulia 1SNPG, susceptible minor vegetable crops, Tomato LYPES, Roman chamomile ANTNO, Rosmarin RMSS
<i>Sclerotinia sclerotiorum</i> SCLESC	White mould	Water melon CITLA or cucumber CUMSC	All crops within the group	Most vegetable crops are susceptible, field beans VICFX, potato SOLTU	turnip BRSRR, susceptible minor vegetable crops, Lettuce LACSS
<i>Phytophthora</i> (<i>Phytophthora</i> <i>nicotianae</i> PHYTNN, <i>P. capsici</i> PHYTCP, <i>P.</i> <i>cactorum</i> PHYTCC etc.)	Blight of sweet pepper	Water Melon CITLA or cucumber CUMSC	All crops within the group		Sweet pepper CPSAN

Table 6: DISEASES ON VEGETABLE BRASSICAS:

Leafy brassicas: BRSOA kale *Brassica oleracea* var. *acephala* including collards and curly kale *Brassica oleracea* var. *sabellica* BRSOC; BRSPK Peking cabbage *Brassica pekinensis*; BRSCH *B. chinensis* [synonyms: *B. rapa* subsp. *chinensis*; *B. chinensis* var. *parachinensis*; *B. parachinensis*]; BRSNO Mitzuna *Brassica rapa* subsp. *nipposinica*; BRSPE Komatsuna *Brassica perviridis*; SINSP mustard *Sinapis* sp. (red, white brown black); DIPER Rockets *Diplotaxis eruroides* and ERUVE *Eruca vesicaria* subsp. *sativa*.

Head brassicas: (Head) Cabbage (includes red BRSOR *Brassica oleracea* var. *capitata* f. *rubra* and white *Brassica oleracea* var. *capitata* f. *alba* BRSOL); BRSON *Brassica oleracea* var. *capitata* f. *conica*; BRSEB Brussels sprouts *B. oleracea* var. *gemmifera*; BRSOS Savoy cabbage *B. oleracea* var. *sabauda*.

Flowerhead brassicas: (Flowering brassicas); BRSOB Cauliflower *B. oleracea* var. *botrytis* subvar. *culitiflora*, BRSOK Broccoli, Calabrese, cima di rapa *B. oleracea* var. *italica*; BRSAG Chinese kale (Chinese broccoli) *Brassica alboglabra*.

Root / Stem brassicas and radish crops: BRSNA Swedes *B. napus* var. *napobrassica*, BRSRR Turnips *B. rapa*, RAPSS Radishes *Raphanus* spp. (including red, white, Black Spanish radish); RAPSR Small radish *Raphanus sativus*; RAPSN Garden radish *Raphanus sativus* var. *niger*; ARWLA Horseradish *Armoracia lapathifolia*; BRSOG Kohlrabi, *B. oleracea* var. *gongylodes*.

Pests		Crops: within the Vegetable Brassicas		Crops: outside the Vegetable Brassicas	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Alternaria</i> spp. (<i>Alternaria brassicicola</i> ALTEBI, <i>A. brassicae</i> ALTEBA, <i>A. raphani</i> ALTERP)	<i>Alternaria</i> leaf spot	Cauliflower BR SOB or broccoli BR SOK or Brussels sprouts BR SOF	Leafy and flower head and root brassicas	Oilseed rape BR SNN, Mustard SINSS	Carrot DAUCS Tomato LYPES
<i>Pseudocercospora capsellae</i> (= <i>Mycosphaerella capsellae</i>) PSDCCA	White leaf spot	Head cabbage BR SON	Leafy and flower head and root brassicas		
<i>Pyrenopeziza brassicae</i> PYRPBR	Light leaf spot	Kales or Collards BR SOA	Leafy and flower head brassicas	Oilseed rape BR SNN	Oilseed rape BR SNN
<i>Mycosphaerella brassicicola</i> MYCOBR	Ring spot	Kales or Collards BR SOA or Brussels sprouts BR SOF	Flower head brassicas and leafy brassicas		Cucumber CUMSC

<i>Colletotrichum higginsianum</i> COLLHG	Anthrachnose	Head cabbage BRSON or turnip BRSRR	Leafy and root brassicas	Mustard SINSS	
<i>Botryotinia fuckeliana</i> BOTRCI	Gray mold	Head cabbage BRSON or Brussels sprouts		Lettuce LACSA Strawberry FRASS, all cucurbit crops 1CUCF, rose ROSSS, artichoke CYUSC, pea PIBSS, potato SOLTU, leek ALLPO, garden bean PHSVX, grapes VITVI, Beans PHSSS,	Lettuce LACSA, Tomato LYPES
<i>Erysiphe cruciferarum</i> ERYSCR, <i>Erysiphe polygoni</i> ERYSPG	Powdery mildews	Head cabbage BRSON or Brussels sprouts BRSOF	Leafy brassicas and flower head brassicas, root brassicae, Swede BRSNA	Cucurbits 1CUCF, Oilseed rape BRSNN Rocket (<i>Diplotaxis erucoides</i> DIPER and <i>Eruca vesicaria</i> subsp. <i>sativa</i> ERUVE)	
<i>Peronospora parasitica</i>	Downy mildews	BRSOK Broccoli	Leafy brassicas,	Lettuce LACSS	

<i>PEROPA</i> <i>Hyaloperonospora brassicae</i> HPERBR		or Cauliflower BRSOB(any crop where use is on seedlings)	Head cabbages	Onion ALLCE, Oilseed rape BRSNN	
<i>Plasmodiophora brassicae</i> PLADBR	Club root of cabbage	BRSOK Broccoli or Cauliflower BRSOB or Kales or Collards BRSOA	Flower head brassicas and leafy brassicas, Head cabbages	Oilseed rape BRSNN, mustard SINSS	
<i>Leptosphaeria maculans</i> = <i>Phoma lingam</i> LEPTMA	Black leg	BRSOK Broccoli or Cauliflower BRSOB or Kales or Collards BRSOA	Flower head brassicas and leafy brassicas, Head cabbages	Oilseed rape BRSNN	Origano ORISS, Fennel FOESS
The following extrapolation possibilities are proposed to be addressed intables covering generic pests					
<i>Rhizoctonia solani</i> RHIZSO <i>Fusarium</i> spp. FUSASP <i>Pythium</i> spp. PYTHSP	Damping off	Any vegetable brassica	Leafy and flower head and head and root brassicas	Any relevant crop*	Lettuce LACSS, Tomato LYPES

<i>Sclerotinia sclerotiorum</i> SCLESC <i>Sclerotinia minor</i> SCLEMI	Stem rot	BRSOK Broccoli or Cauliflower BRSOB or Kales or Collards BRSOA	Flower head brassicas, leafy brassicas and Head cabbages	Lettuce LACSA, oilseed rape BRSNN	Oilseed rape BRSNN, Lettuce LACSS, Tomato LYPES
<i>Acidovorax valerianella</i> ACVRVA , <i>Pseudomonas sp.</i> ERWICA , <i>Xanthomonas sp.</i> XANTSP	Bacterial disease	Any vegetable brassica	All vegetable brassica		Lettuce LACSS, Herbs
<i>Verticillium spp.</i> VERTSP	Verticillium wilt	Brussels sprouts BRSOA or Head cabbages BRSON		Tomato LYPES, Eggplant SOLME, Capsicum CPSSS	

Table 7: DISEASES ON ALLIUM VEGETABLES

ALLCE Onion *Allium cepa*, ALLAS Shallots *Allium cepa* *Aggregatum* types, ALLAH Silverskin onions *Allium ampeloprasum* f. *holmense*, ALLFI Welsh onion (Spring onion, Bunching onion) *Allium fistulosum*, ALLSC Chives *Allium schoenoprasum*, ALLSA Garlic *Allium sativum*, ALLPO Leek *Allium porrum*.

Pest		Crops: within allium vegetables		Crops: outside allium vegetables	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Botryotinia porri</i> BOTTPQ, <i>B. squamosa</i> SCLESQ, <i>B. alli</i> BOTRAL	Grey mould bulb rot and collar rot	Onion or Garlic	All Allium ALLSS		
<i>Fusarium oxysporum</i> (f.sp. <i>Cepae</i>) FUSACE	Root rot, Pink root	Onion or Garlic	All Allium ALLSS	Allium ornamental bulbs	Allium ornamental bulbs
<i>Pyrenochaeta terrestris</i> PYRETE	Pink root	Onion or Garlic	All Allium ALLSS		
<i>Davidiella allii-cepae</i> (=Heterosporium <i>allii</i>) CLADAC	Onion leaf spot	Onion or Garlic	All Allium ALLSS	Allium ornamental bulbs	Allium ornamental bulbs

<i>Peronospora destructor</i> PERODE	Downy mildew of onion	Onion or Garlic	All Allium ALLSS		Allium ornamental bulbs
<i>Phytophthora porri</i> PHYTPO	Neck or bulb rot	Leek ALLPO or Onions	Onion ALLCE Welsh Onion ALLFI, Chives ALLSC,		
<i>Stromatinia cepivorum</i> (=Sclerotium cepivorum) SCLOCE	White rot of onion	Onion or Garlic	All Allium ALLSS		
<i>Urocystis colchici</i> (=Urocystis cepulae) UROCCE	Smut of onion	Onion or Garlic	All Allium ALLSS		
<i>Alternaria porri</i> ALTEPO <i>Pleospora allii</i> (=Stemphylium vesicarium) PLEOAL	Purple blotch Leaf blight	Onion or Garlic	All Allium ALLSS	Tomato LYPES PotatoSOLTU Pear PYUSS (only for PLEOAL), asparagus ASPSS, allium ornamental bulbs, arachis sp. ARHSS	Tomato LYPES Allium ornamental bulbs, Arachis sp. ARHSS

<i>Puccinia allii</i> PUCCAL, <i>P. porri</i> PUCCPO	Rust	Onion or Garlic	All allium ALLSS		Mint MENSSE, Tarragon ARTDR
<i>Collectotrichum dematium</i> f.sp <i>circinans</i>	Smudge	Onion ALLCE	All Allium ALLSA		
The following extrapolation possibilities are proposed to be addressed in tables covering generic pests					
<i>Pythium</i> sp. PYTHSP	Damping off	Onion or Garlic	Garlic ALLSA, shallot ALLAS, leek ALLPO		Tomato LYPES
<i>Rhizoctonia</i> spp. RHIZSP (soil borne)	Rhizoctonia rot	Leek ALLPO or onions	All Allium ALLSA		Tomato LYPES

Table 8: DISEASES ON CHENOPODIACEOUS VEGETABLES

Spinach *Spinacia oleracea* SPQOL, Chard *Beta vulgaris* BEAVV, Swiss chard *Beta vulgaris* subsp. *vulgaris* var. *flavescens* BEAVF, Beetroot *Beta vulgaris* subsp. *vulgaris* var. *conditiva* BEAVD, Garden beet *Beta vulgaris* subsp. *vulgaris* var. *lutea* BEAVL, Quinoa *Chenopodium quinoa* CHEQU, White goosefoot (wild spinach) *Chenopodium album* CHEAL

Diseases		Crops: within the chenopodiaceous vegetables		Crops: outside the chenopodiaceous vegetables	
1 Pathogen species	2 Disease group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Aphanomyces cochlioides</i> APHACO <i>Aphanomyces cladogamus</i>	Root rot	Beetroot BEAVD or Spinach BEAVV	To all chenopodiaceous vegetables	Sugarbeet BEAVA*	
<i>Phytophthora</i> PHYTSP				Sugarbeet BEAVA	
<i>Pythium</i> PYTHSP, <i>Fusarium</i> FUSASP				Sugarbeet BEAVA, Carrot DAUCA, Lettuce LACSA	Carrot DAUCA, Lettuce LACSA, Rocket ERUVE/DIPER, Fennel FOEVA
<i>Thanatephorus cucumeris</i> RHIZSO				Sugarbeet BEAVA, Lettuce LACSA, Brassica 1BRSG, Carrot DAUCA	
<i>Pleospora betae</i> PLEOBJ				Sugarbeet BEAVA*, Any umbelliferous (Phoma)	Any umbelliferous
<i>Cercospora beticola</i>	Cercospora Leaf spot	Spinach	To all chenopodiaceous vegetables		
	Powdery mildew	Spinach	To all chenopodiaceous vegetables		

Table 9: DISEASES ON ROOT, STEM AND TUBER VEGETABLES

Cassava roots/manioc *Manihot esculenta* MANES, Sweet potatoes *Ipomoea batatas* IPOBA, Yams *Dioscorea spp.* DIUSS, Arrowroots *Maranta arundinacea* MARAR, Taro *Colocasia esculenta* CXSES

Diseases		Crops: within Tropical root and tuber		Crops: outside Tropical root and tuber vegetables	
1 Pathogen species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Drechslera euphorbiae</i> (= <i>Helminthosporium euphorbiae</i>) DRECEU	Silvery gall	Sweet potatoes IPOBA	All tropical root vegetables	Potato SOLTU	
<i>Phoma sp.</i> PHOMSP	Canker, Phoma leaf spot	Yam DIUSS		Potato SOLTU	
<i>Colletotrichum sp.</i> COLLSP	Anthrachnose			Potato SOLTU, Tomato LYPES	
<i>Phytophthora colocasiae</i> PHYTOO	Leaf blight	Taro CXSES		Potato SOLTU, Tomato LYPES	

Table 10: DAMPING-OFF, SOIL AND AIRBORN FUNGAL DISEASES Table a Extrapolation table for damping off effects

Diseases	Cr
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1 Pest species	2 Pest group name	3 Indicator crops <i>Data from any other relevant crop, if available, can support (reduced data) the indicator crop</i>	4 Extrapolation to other crops or crop groups
<i>Pythium</i> sp. PYTHSP <i>Oomycetes</i> 1OOMYC	Damping off	Lettuce LACSA or vegetable brassicae or Cucumber CUMSA or Melon CUMME or Spinach SPQOL or Beet BEASS or Tomato LYPES	All crops where damping off caused by Oomycetes appear
<i>Aphanomyces</i> sp. APHASP		Pea PIBSX or Sugar beet BEAVA	Other leguminous crops Other beet crops (<i>Beta</i> sp. BEASS), Chenopodioideae 1CHES
<i>Alternaria</i> sp. ALTESP		Head cabbage BRSON or Tomato LYPES or Pepper CPSAN or Cucurbitaceae 1CUCF	All crops where alternaria damping- off appear
<i>Fusarium</i> sp. FUSASP		Tomato LYPES or Cucurbitaceae 1CUCF (both grown in the soil)	All crops where Fusarium damping off appear
<i>Thanatephorus cucumeris</i> (= <i>Rhizoctonia solani</i>) RHIZSO		Potato SOLTU (AG3, AG2-1), or Lettuce LACSA (AG4), or Cucurbitaceae 1CUCF (in soil) (AG4 (AG5)), or Vegetable brassica (AG2-1, AG4) or Beets BEAVD (AG2-2, AG4, AG1, AG3, AG5) or Fabaceae 1LEGF (AG4, AG2-2) or Strawberry FRASS	All crops where damping off caused by the same AG-groups appear

Table b Extrapolation table for other crop effects other than damping off

Diseases		Crops	
1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops or

		<i>Data from any other relevant crop, if available, can support (reduced data) the indicator crop</i>	crop groups
<i>Alternaria</i> sp. ALTESP	Leaf spots	Chinese cabbage BRSPK or Carrot DAUCA or Potato SOLTU	All crops where alternaria appear
	Fruit spot	Tomato LYPES	All crops where alternaria appear
<i>Fusarium</i> sp. FUSASP	Root rot and wilt	Any relevant crop	Any crop within the same crop botanical family
<i>Pythium</i> sp. PYTHSP	Root rot	Any relevant crop	Any crop within the same crop botanical family
<i>Phytophthora</i> sp. PHYTSP (except <i>P. infestans</i>)	Downy mildew	Potato SOLTU or Tomato LYPES or cucurbitaceae (depending on <i>P.</i> species)	Any other solanaceae or cucurbitaceae or to other crops with reduced data (depending on <i>P.</i> species)
<i>Phytophthora cinnamomi</i> PHYTCN	Phytophthora root rot	<i>Chamaecyparis</i> sp. CHCSS	Any relevant crop

Table 11: Seed borne diseases

Seed borne diseases	Cr
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1 Pest species	2 Pest group name	3 Indicator crops <i>Data from any other relevant crop, if available, can support (reduced data) the indicator crop</i>	4 Extrapolation to other crops ¹
<i>Alternaria</i> sp. ALTESP e.g. <i>A. alternata</i> ALTEAL <i>A. dauci</i> ALTEDA <i>A. brassicae</i> ALTEBA <i>A. brassicicola</i> ALTEBI <i>A. raphani</i> ALTERP <i>A. cichorii</i> ALTECC <i>A. porri</i> ALTEPO <i>A. cucumerina</i> ALTECU <i>A. solani</i> ALTESO	Leaf spot	Tomato LYPES or Any Umbelliferous or Any brassica vegetable or Any Asteraceae 1COMF or Any Allium ALLSS or Cucumber CUMSC or Melon CUMME or Fabaceae 1LEGF	To all host crops of <i>Alternaria</i> or Stemphyliose
<i>Stemphylium</i> sp. STEMSP <i>Pleospora herbarum</i> (= <i>Stemphylium botryosum</i>) PLEOHE	Stemphyliose leaf spot/blight		
<i>Cercospora</i> sp. CERCSP e.g. <i>C. beticola</i> CERCBE, <i>C. kikuchii</i> <i>C. apii</i> CERCAP, <i>C. foeniculi</i> (= <i>Passalora puncta</i>) CERCPE, <i>C. carotae</i> CERCCA	Leaf spot	Any Chenopodiaceae 1CHES or Fabaceae 1LEGF or Umbelliferous 1UMBF	To all host crops of <i>Cercospora</i>

B. EXTRAPOLATION TABLES FOR EFFICACY OF INSECTICIDES

Table 1: INSECTICIDES - PESTS ON CUCURBITACEAE

Cucumber *Cucumis sativus* CUMSC, Courgette *Cucurbita pepo* var. *giromontiina* (including zucchini and marrow squash) CUUPG, Marrow *Cucurbita maxima* (Squash and pattypan/scallop squash and gourds) CUUPE, Pumpkin *Cucurbita pepo* var. *melo* CUUPM, Melon *Cucumis melo* CUMME, Water Melon *Citrullus lanatus* CITLA

Pest		Crop: within the Cucurbitaceae		Crops: outside Cucurbitaceae	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u><i>Bemisia tabaci</i></u> <i>Trialeurodes</i> spp.	Whiteflies	water melon or courgette	All crops within the crop group	Phaseolus spp., cotton, strawberry, Solanaceous crops	Poinsettia, Gerbera spp., asteracea, rose, tobacco, lettuce, rubus spp., ribes spp.
<u><i>Liriomyza trifolii</i></u> , <i>Liriomyza</i> spp.	Dipteran leaf miners	water melon or courgette	All crops within the crop group	Phaseolus spp., field bean, lettuce, Solanaceous crops	rhubarb, spinach, celeriac, celery, lambs lettuce, Gerbera spp., chrysanthemum, gypsophila

<i>Delia platura</i>	Root and soil flies	water melon or courgette	All crops within the crop group	field bean , potato , soybean, Phaseolus spp., spinach, asparagus	Freesia
<i>Aphis gossypii</i> and <i>Myzus persicae</i> , <i>Myzus</i> spp.	Aphids	water melon or courgette	All crops within the crop group	strawberry, cotton , Solanaceous crops, Phaseolus spp.	Chrysanthemum, hibiscus, rose
<i>Frankliniella</i> spp., <i>Thrips</i> spp.	Thrips	water melon or courgette	All crops within the crop group	strawberry, Solanaceous crops, Phaseolus spp., cotton, flowering ornamentals	
<i>Tetranychus urticae</i>	Spider mites	water melon or courgette	All crops within the crop group	Phaseolus spp. , ornamentals, cotton , soybean, strawberry, Solanaceous crops	Passion fruit

Table 2: PESTS ON VEGETABLE BRASSICAS

Leafy brassicas: BRSOA kale *Brassica oleracea* var. *acephala* including collards and curly kale *Brassica oleracea* var. *sabellica* BRSOC; BRSPK Peking cabbage *Brassica pekinensis*; BRSCH *B. chinensis* [synonyms: *B. rapa* subsp. *chinensis*; *B. chinensis* var. *parachinensis*; *B. parachinensis*]; BRSNO Mitzuna *Brassica rapa* subsp. *nipposinica*; BRSPE Komatsuna *Brassica perviridis*; SINSP mustard *Sinapis* sp. (red, white brown black); DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *sativa*.

Head brassicas: (Head) Cabbage (includes red BRSOR *Brassica oleracea* var. *capitata* f. *rubra* and white *Brassica oleracea* var. *capitata* f. *alba* BRSOL); BRSON *Brassica oleracea* var. *capitata* f. *conica*; BRSEF Brussels sprouts *B. oleracea* var. *gemmifera*; BRSOS Savoy cabbage *B. oleracea* var. *sabauda*.

Flowerhead brassicas: (Flowering brassicas); BRSOB Cauliflower *B. oleracea* var. *botrytis* subvar. *cultiflora*, BRSOK Broccoli, Calabrese, cima di rapa *B. oleracea* var. *italica*; BRSAG Chinese kale (Chinese broccoli) *Brassica alboglabra*.

Root / Stem brassicas and radish crops: BRSNA Swedes *B. napus* var. *napobrassica*, BRSRR Turnips *B. rapa*, RAPSS Radishes *Raphanus* sp. (including red, white, Black Spanish radish); RAPSR Small radish *Raphanus sativus*; RAPSN Garden radish *Raphanus sativus* var. *niger*; ARWLA Horseradish *Armoracia lapathifolia*; BRSOG Kohlrabi, *B. oleracea* var. *gongylodes*.

Pests		Crops: within Vegetable Brassicas		Crops: outside Vegetable Brassicas	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u><i>Delia radicum</i></u> (soil), <i>Delia</i> sp	Root flies	Cauliflower or Turnip or Radish	Leafy and flower head and head brassicas Root brassicas	Onion	Oilseed rape (if a pest problem) , Spinach, Herbs Beans, Onion
<u><i>Delia radicum</i></u> (leaves) <i>D. floralis</i>	Flies	Head cabbage and Brussels sprouts	Leafy brassicas	<u><i>Delia radicum</i></u> (leaves) <i>D. floralis</i>	
<i>Delia radicum</i> (flower buds)	Flies	Broccoli or Cauliflower	Flowerhead brassicas	<i>Delia radicum</i> (flower buds)	

<u><i>Brevicoryne brassicae</i></u> <u><i>Lipaphis erysimi</i></u>	Aphids	Head cabbage	Leaf and flower head and root brassicas	Oilseed rape any other crop for aphids other than <i>Brevicoryne brassicae</i>	Oilseed rape, Lettuce, Tomato, Herbs
Myzus persicae		head cabbage		Lettuce	* for all: Gherkins, Blanched celery and green celery, Courgettes, Patisson, Celeriac, Florence fennel, Fennel, Beetroot, Leek, Rhubarb, Lettuce, Green Belgian endive, Endive, Spinach, Lamb's lettuce, Witloof and chicory roots (root growing culture), French beans, Slicing beans, Runner bean, Parsley, Chervil and Celery leaves, Ornamentals
<u><i>Aleurodes proletella</i></u>	Whiteflies	head cabbage and Brussels sprouts	Leafy and flower head ,savoy cabbage and root brassicas	Ornamentals	Celery
<u><i>Phyllotreta</i> sp.</u>	Flea beetles	Any vegetable brassica	Leafy and flower head and head and root brassicas	Spring oilseed rape, Tomato Cucumber	Oilseed rape (<i>Phyllotreta</i> only), Tomato, Herbs
<u><i>Putella xylostella</i></u> <i>Mamestra brassicae</i> or	Caterpillars	Any vegetable brassica	Leafy and flower head and root brassicas	Oil seed rape	Oil seed rape, Herbs

<i>Pieris brassicae</i> , <i>pieris rapae</i>					
<i>Meligethes sp.</i>	pollen beetle	Broccoli or Cauliflower	All cabbage species	Oil seed rape* or Mustard	Oilseed rape, Mustard, Herbs
<i>Dasineura sp.</i> , <i>Contarinia</i> <i>nasturtii</i>	Gall midges	Broccoli or Cauliflower	Leafy and flower head and head and root brassicas		Herbs Oilseed rape
<i>Liriomyza sp</i> <i>LIRISP</i> , <i>Phytomyza</i> <i>rufipes</i> <i>PHYRRU</i> , <i>Scaptomyza</i> <i>flava SCATFL</i>	Stem and leaf miner flies	Any vegetable brassicas	All vegetable brassicas	Oil seed rape BRSNN or Mustard SINSS	Tomato LYPES, Lettuce LACSA, Spinach BEAVV Herbs, Celery APUGV
<i>Ceutorhynchus</i> <i>quardridens</i> (= <i>Ceutorhynchus</i> <i>pallidactyrus</i>) <i>CEUTQU</i>	Cabbage weevil	Any vegetable brassicas	All vegetable brassicas	Oil seed rape BRSNN	

Table 3: PESTS ON RHUBARB AND ASPARAGUS
Rhubarb *Rheum rhabarbarum* RHERH, Asparagus *Asparagus officinalis* ASPOF

Pests		Crops: rhubarb and asparagus		Crops: outside rhubarb and asparagus	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Delia platura</i> , <i>Delia florilega</i> , <i>Delia</i> sp.	Rootflies	Asparagus		<i>Phaseolus</i> spp. , <i>Phaseolus</i> spp. and any other crops in which the pest occurs	Cucurbitaceae, Allium sp. Cucurbitaceae, <i>Allium</i> spp.
<i>Platyparea poeciloptera</i> , <i>Ophiomyia simplex</i>	Asparagus flies				
<i>Hypopta caestrum</i>	Caterpillars			Any crop affected by this pest	Any crop affected by this pest
<i>Ostrinia nubilalis</i> ,				Zea mays, <i>Phaseolus</i> spp., Pepper	Pepper
<i>Autographa</i>				Any vegetable brassica,	

<i>gamma</i>				Lettuce, Allium vegetables	
<i>Crioceris asparagi</i> , <i>Crioceris duodecimpunctata</i> , <i>Crioceris sp.</i>	Leaf beetles			Umbelliferous crops and any other crop affected by these pests	Any other crop affected by these pests
<i>Collembola</i>	Collembola			Root brassicas, Cucumber	
<i>Blaniulus guttulatus</i>	Millipedes			Cucumber, Strawberry	

Table 4: PESTS ON LEGUME VEGETABLES

Vicia faba VICFX, *Phaseolus* sp. PHSSS, *Pisum sativum* PIBSX, *Lens culinaris* LENCU, *Cicer arietinum* CIEAR, *Arachis hypogea* ARHHY

Pests	Crop: within Peas and Beans	Crops: outside Peas and beans
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1 Pest species	2 Pest group name	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<u><i>Myzus persicae</i></u> , <u><i>Aphis fabae</i></u> , <i>Macrosiphum euphorbiae</i> , <i>Aulacorthum solani</i> , <i>Uroleucon sonchi</i> <i>Megoura viciae</i>	Leaf aphids (field conditions)	Any <i>Phaseolus</i> sp. or <i>Vicia</i> sp. or <i>Pisum sativum</i> or chickpea	All <i>Pisum</i> sp. and <i>Phaseolus</i> sp. chickpea, Lentils and <i>Vicia</i> sp	Ornamentals, Peach Chenopodioideae, Cucumber Chinese cabbage, Solanaceae, Strawberry	Herbs, Ornamentals, Solanaceae, Strawberry
<u><i>Aphis gossypii</i></u> and two other aphid species among <i>Myzus persicae</i> , <i>Aphis</i> sp., <i>Macrosiphum euphorbiae</i> , <i>Aulacorthum solani</i>	Leaf aphids (protected conditions)	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp. , Lentils	Cucurbitaceae*, Ornamentals, Solanaceae	Herbs, Ornamentals, Solanaceous crops, Strawberries
<i>Acyrtosiphon pisum</i> or <i>Acyrtosiphon</i> sp.	Leaf aphids	Any <i>Pisum</i> sp.	All <i>Phaseolus</i> sp.		

<i>Delia</i> sp.	Bean seed fly	Any <i>Phaseolus</i> sp.	All <i>Pisum</i> sp. and <i>Phaseolus</i> sp., <i>Vicia</i> sp., Chickpea	Allium vegetables	Asparagus , Spinach , Allium vegetables, Cucurbitaceae Freesia
<i>Liriomyza</i> sp., <i>Chromatomyia syngenesiae</i> , <i>Phytomyza</i> sp.	Leaf miner flies	Any <i>Phaseolus</i> sp. or <i>Pisum</i> sp., Chickpea	All <i>Phaseolus</i> sp. or <i>Pisum</i> sp., Chickpea, <i>Vicia</i> sp	Tomato *, Ornamentals, Leafy vegetables, Vegetable brassicas and cucumber	Tomato, Cucurbitaceae, Alliaceae
<i>Contarinia pisi</i> , <i>Contarinia</i> sp.	Gall midge	Any <i>Pisum</i> sp.	Lentil, All <i>Vicia</i> sp	Vegetable brassica	
<i>Tetranychus urticae</i>	Spider mites	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp.	Cucurbitaceae, Ornamentals	Cucurbitaceae, Ornamentals, Tomato
<u><i>Chrysodeixis chalcites</i></u>	Caterpillars	Any <i>Phaseolus</i> sp. or <i>Pisum</i> sp., chickpea	All <i>Phaseolus</i> sp. or <i>Pisum</i> sp., Chickpea, Lentils	<i>Chrysodeixis chalcites</i> in any crop*	
<u><i>Spodoptera exigua</i></u>				<i>Spodoptera exigua</i> in any crop*	
<i>Autographa gamma</i> or				<i>Autographa</i>	

<i>Mamestra</i> sp.				<i>gamma</i> or <i>Mamestra</i> sp. in any crop*	
<u><i>Ostrinia</i> sp.</u> , <i>Helicoverpa</i> <i>armigera</i>				Cucurbitaceae , Solanaceous crops, Maize	
<u><i>Cydia nigricans</i></u>	Caterpillars	Any <i>Pisum</i> sp.	Lentil, All <i>Pisum</i> sp	Cucurbitaceae	Herbs
<u><i>Bruchus</i> sp.</u> <i>Acanthoscelides</i> sp.	Weevils	Any <i>Pisum</i> sp. or <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp. , Broad beans, Lentil, Field beans, Chickpea and <i>Vicia</i> sp		Pulses forage
<i>Sitona lineatus</i>		Any <i>Pisum</i> sp	All <i>Phaseolus</i> sp. and <i>Vicia</i> sp	Soybean, <i>Lupinus</i> sp	Soybean, <i>Lupinus</i> sp, Pulses forage
<u><i>Frankliniella</i> sp.</u> (except <i>F.</i> <i>occidentalis</i> ¹),	Thrips	Any <i>Pisum</i> sp. or <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp., All <i>Pisum</i> sp., <i>Vicia</i> sp	Tomato, Ornamentals, Allium vegetables,	Tobacco Ornamentals

<i>Thrips</i> sp. , <i>Kakothrips</i> sp.				Brassica vegetables	
<u><i>Ophiomyia</i></u> <u><i>phaseolus</i></u>	Bean fly (Bean stem maggot)	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp., All <i>Pisum</i> sp., <i>Vicia</i> sp and all relevant leguminous crops		
<u><i>Agrotias</i> sp</u>	Cut worms	Any <i>Phaseolus</i> sp.	All <i>Phaseolus</i> sp., All <i>Pisum</i> sp., <i>Vicia</i> sp and all relevant leguminous crops		

Table 5: PESTS IN UMBELLIFEROUS CROPS

DAUCA Carrot *Daucus carota*, APUGV Celery *Apium graveolens* and APUGR Celeriac *Apium graveolens* var. *rapaceum*, FOEVD Fennel *Foeniculum vulgare* var. *dulce*, PAVSA Parsnip *Pastinaca sativa*, PARCR Parsley *Petroselinum crispum*, CORSA Coriander *Coriandrum sativum*, CRYCA Caraway *Caraway*

Pests		Crops: within the Umbelliferae		Crops: outside the Umbelliferae	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)

<i>Aulacorthum solani</i> ; <i>Cavariella aegopodii</i> ; <i>Dysaphis crataegi</i> ; <i>Hyadaphis foeniculi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i> ; <i>Semiaphis dauci</i>	Aphididae	Any umbelliferous	All umbelliferous	Lettuce Cucumber	Black salsify
<i>Pemphigus</i> sp. , <i>Pemphigus phenax</i>	Root aphids	Carrot or Fennel		Lettuce, Chicory	Herbs
<i>Chamaepsila rosae</i> , (syn. <i>Psila rosae</i>)	Carrot root fly	Carrot	All other umbelliferous	Onion, Vegetable brassicas	Herbs, Crops for seed production, Spinach
<i>Depressaria pastinacella</i> , <i>Plutella xylostella</i> , <i>Hepialus humuli</i> , <i>Hepialus lupulinus</i> , <i>Autographa</i> sp. , <i>Mamestra</i> sp. and other caterpillar species	Caterpillars	Celery or Parsley or Caraway	All umbelliferous	Lettuce All brassicas	
<u><i>Phyllotreta cruciferae</i></u>	Flea beetles	Any umbelliferous	All umbelliferous	All brassicas*	
<i>Napomyza carotae</i> ,	Mining fly (damaging roots)	Carrot or Celery	All umbelliferous	Lettuce, Lambs	Herbs

<i>Liriomyza</i> sp. , <i>Euleia</i> sp. (= <i>Philophylla</i> sp.)	Mining fly (damaging leaves)			lettuce	Ornamentals Leafy brassicas
<i>Trioza apicalis</i> ,	Carrot psyllid	Carrot	Parsnips		
<i>Cixius wagneri</i>	Leafhopper	Celeriac	Carrot, Fennel	Strawberry Ornamentals	Herbs
<i>Thrips</i> sp	Thrips	Fennel	Carrot, celeriac	Leek	
<i>Lygus rugulipennis</i>	Bugs	Carrot, Celery		Cucumber, Lettuce, strawberry	

Table 6: PESTS ON LEAFY VEGETABLES

Asteraceae : LACSA lettuce *Lactuca sativa*, LACSE prickly lettuce *Lactuca serriola*, CICEN endive *Cichorium endivia*, CICIN chicory *Cichorium intybus*, CICIF chicory witloof *Cichorium intybus* var. *foliosum*, TAROF dandelion *Taraxacum officinale*.

Crucifereae : LEPSA garden cress *Lepidium sativum*, BARVE landcress *Barbarea verna*, DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *Sativa*, NAAOF watercress *Nasturtium officinale*, BRSJU leaf mustard *Brassica juncea*.

Chenopodioideae : SPQOL spinach *Spinacia oleracea*, BEAVV chard *Beta vulgaris* subsp. *vulgaris*.

Other: VLLLO lamb's lettuce *Valerianella locusta*, SANMI burnet *Sanguisorba minor*, VERBE cow cress *Veronica beccabunga*, VLLER Italian corn salad *Valerianella eriocarpa*, POROS purslane *Portulaca oleracea* subsp. *sativa*.

Pest		Crop: within the leafy vegetables		Crops: outside leafy vegetables	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other	Data from these crops can support	Extrapolation to crops

			crops	the indicator crops (reduced data or no data *)	(reduced or no data*)
<i>Pemphigus bursarius</i>	Aphids	kales	chicory, witloof, lettuce	Carrot, Tomato,	umberliferous herbs,
<i>Nasonovia ribisnigri</i> ^a , <i>Myzus persicae</i> , <i>Macrosiphum</i> sp., <i>Aphis.gossypii</i> , <i>Acyrtosiphon</i> sp., <i>Aulacorthum</i> sp., <i>Uroleucon sonchi</i>		kale	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae (particularly prickly lettuce, dandelion, spinach, chicory, witloof, rocket, chard), Italian corn salad, lamb's lettuce	Cucurbitaceae, Solanaceae, Brassicaceae, leguminous vegetables	Umbelliferae, Alliaceae, ornamentals, fresh herbs
<i>Liriomyza</i> sp., <i>Pegomya</i> sp., <i>Phytomyza</i> sp.	Mining flies	kale	Leafy vegetables of the Asteraceae, Crucifereae , Chenopodioideae (prickly lettuce, spinach, witloof, rocket, chard, lamb's lettuce	Cucurbitaceae 1, beets, leguminous vegetables, Solanacea	Celery, parsley, ornamentals, fresh herbs
<i>Pegomya hyoscyami</i> (Mangold fly)		Spinach	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae	Beets	

<i>Delia platura</i>	Root flies	Spinach	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae, Lamb's lettuce	Beans, cabbage, umbelliferous vegetables, onion	Fresh herbs
<i>Autographa gamma</i> ., <i>Mamestra</i> sp., <i>Spodoptera</i> sp.	Caterpillars	Lettuce or Kale	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae (particularly prickly lettuce, dandelion, spinach, chicory, witloof, rocket, chard), , lamb's lettuce	Solanaceae, Crucifereae, beans, beets	Umbelliferae, beetroot, fresh herbs, ornamentals
<i>Trialeurodes</i> sp. , <i>Bemisia</i> sp.	Whiteflies	Lettuce or Kale	Leafy vegetables of the Asteraceae, Crucifereae, Chenopodioideae(particularly prickly lettuce , dandelion, rocket),	Cucurbitaceae*, Solanaceae*, strawberry*	Tobacco
<i>Thrips tabaci</i> ., <i>Frankliniella occidentalis</i> , Thysanoptera	Thrips	Lettuce or Kale	Leafy vegetables of the Asteraceae, Crucifereae , Chenopodioideae (particularly, chicory , witloof, rocket),	Solanaceae, Cucurbitaceae, beans, Crucifereae, alliums, ornamentals	Fresh herbs
<i>Lygus rugulipennis</i>	Bishop bug	Lettuce	chicory, witloof, salad rocket	Cucurbitaceae, Crucifereae	

Table 7: PESTS ON ALLIUM VEGETABLES

ALLCE Onion *Allium cepa*, ALLAS Shallots *Allium cepa* *Aggregatum* types, ALLAH Silverskin onions *Allium ampeloprasum* f. *holmense*, ALLFI Welsh onion (Spring onion, Bunching onion) *Allium fistulosum*, ALLSC Chives *Allium schoenoprasum*, ALLSA Garlic *Allium sativum*, ALLPO Leek *Allium porrum*

Pest		Crop: allium vegetables ⁱ			
1 ⁱ	2	3 ⁱ	4	5 ⁱ	6 ⁱ
Pest species	Pest group name	Indicator crops within the crop group	Extrapolation to other crops within the group	Extrapolation from crops outside this crop group that enables reduced or no data* on the indicator crops	Extrapolation to crops outside the crop group with reduced or no data*
<i>Delia antiqua</i>	Onion fly	onion	Allium vegetables		herbs and flowered seed crops, herbs

<i>Delia platura</i>	Onion maggot	onion	Allium vegetables	tomato potato cucumber melon garden bean	herbs and flowered seed crops herbs, zucchini gherkin carnation sword lily radish turnip faba bean asparagus spinach
<i>Thrips tabaci</i>	Onion thrips	onion or leek	Allium vegetables	potato lucerne beta beet cucumber melon strawberry cabbage tomato	carnation ornamental crops, gherkin zucchini garden vegetables, herbs and flowered seed crops, herbs, eggplant common fennel sweet pepper

<i>Acrolepiopsis assectella</i>	Leek moth	onion	Allium vegetables		herbs and flowered seed crops
<i>Myzus ascalonicus</i>	Shallot aphid	onion	Allium vegetables	Potato strawberry beta lettuce tomato cucumber beet	herbs, herbs and flowered seed crops, endive eggplant sweet pepper , wild lettuce spinach
<i>Dyspessa ulula</i>	Garlic borer	Onion	Allium vegetables		
<i>Phytomyza gymnostoma</i>	Leaf miners	Onion	Allium vegetables		
<i>Aceria tulipae</i>	Wheat curl mite	Garlic	Shallot		

Table 8: PESTS ON FRUITING SOLANACEOUS CROPS

LYPES Tomato *Solanum lycopersicum*, SOLME Aubergine *Solanum melongena*, CPSAN Sweet Pepper *Capsicum annuum*, CPSFR Chilli *Capsicum frutescens*, PHYSS *Physalis* sp., SOLMU Pepino *Solanum muricatum*

Pests		Crops: within Fruiting Solanaceous crops		Crops: outside Fruiting Solanaceous crops	
Pest species	2 Pest group	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
<i>Aphis fabae</i>	Aphids	Tomato	Sweet pepper	Potato, Bean, Garden Carrot, Beta Beet, Field Bean, Strawberry	Faba bean , Field bean, Ornamental crops, Garden bean, Tobacco, Lettuce, Potato , Spinach , Tropical root vegetables
<i>Aphis gossypii</i>		Tomato	Eggplant, Sweet pepper	Cucurbitaceae, Strawberry, Lettuce, Cotton	Zucchini, Mallow, Other Ornamental Crops, Citrus, herbs
<i>Myzus persicae</i>		Tomato	Eggplant , Sweet pepper	Potato, Cabbage, Cucumber, Melon, Lettuce, Strawberry, Rape, Lettuce, Beets	Chicory, Zucchini, Spinach, Citrus, Ornamental Crops: Floral crops (Chrysanthemum, Dahlia, Carnation, Etc.), herbs
<i>Macrosiphum euphorbiae</i>					
<i>Aculops lycopersici</i>	Bud and rust mites	Tomato	Eggplant	Potato	
<i>Polyphagotarsonemus latus</i>	Broad mite	Eggplant	Tomato		Common ivy

<i>Tetranychus</i> sp. <i>Tetranychus</i> <i>evansi</i> <i>Tetranychus</i> <i>urticae</i> ¹	Spider mites	Tomato	Sweet pepper , Eggplant,	Potato, Garden Bean, Cucurbitaceae	Cotton, Relevant seed crops,Ornamentals, Tobacco, Cucurbitaceae, Herbs
<i>Leptinotarsa</i> <i>decemlineata</i>	Colorado beetle	Tomato	Eggplant, sweet pepper	Potato	
<i>Ostrinia</i> <i>nubilalis</i>	European corn borer	Tomato	Eggplant , Sweet pepper	Maize * Fabaceae	Hop, Raspberry, Gladiolus
<i>Phthorimaea</i> <i>operculella</i> , <i>Tuta absoluta</i>	Leaf miners	Tomato	Eggplant	Potato	Tobacco
<i>Liriomyza</i> sp.	Stem and leaf miner flies	Tomato	Sweet pepper, Chilli pepper, Eggplant	Cucumber, Lettuce, Cabbage, Potato, Rape, Garden bean, Melon	Chicory , Celery, Ornamentals (Chrysanthemum), Gerbera, Beta beet, Pea
<i>Helicoverpa</i> <i>armigera</i>	Bollworms	Tomato	Eggplant, Sweet pepper	Maize, Lettuce	Cotton, Tobacco, Artichoke, Carnation, Fabaceae
<i>Autographa</i> <i>gamma</i> , <i>Lacanobia</i> <i>oleracea</i> (=Mamestra <i>oleracea</i>)	Caterpillars	Tomato	Eggplant, Sweet pepper	Potato, Beta beet, Cereals, Maize, Brassicaceae, Beta beet, Lettuce	Flax , Asparagus
<i>Metcalfa</i> <i>prunosa</i>	Leaf hopper	Tomato	Egg plant, Sweet pepper	Potato	Trees and bushes: Magnolia, Olive, Herbs, Ornamentals

C. EXTRAPOLATION TABLES FOR CROP SAFETY OF FUNGICIDES AND INSECTICIDES

The extrapolation tables should be used in conjunction with efficacy extrapolation guidelines. The tables provide detailed lists of acceptable extrapolations organized by crop groups for the regulatory authority and applicants in the context of the registration of plant protection products for minor uses. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. The regulatory authority excludes liability as to the reliability of the information provided through these tables.

For seed treatments, indicator crops should include seeds of similar or smaller size. Specific trials with insecticides and fungicides are not essential for foliar treatment. Observations in efficacy or residue trials are usually acceptable. For seed treatment a germination study on the indicator crop is usually necessary.

Table 1. VEGETABLE BRASSICAS

Treatment type		Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Type of application	Crop	Crop	Crop	Crop
Seed treatment		Cauliflower BRSOB	Leafy and flower head and head and root brassicas	Lettuce LACSA	
Soil treatment		Any			
Foliar treatment	Before heading	Head cabbage			
	After heading	Head cabbage <u>and</u> Broccoli BRSOK <u>or</u> cauliflower BRSOB			

Table 2: LEAFY VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Kale and Spinach BEAVV or Lettuce LACSS	All leafy vegetables	Head brassicas	
Soil treatment				
Foliar treatment				

Table 3: CUCURBITACEAE

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Cucumber CUMSC or water melon CITLA	All the crops within the crop group		
Soil treatment				
Foliar treatment				

Table 4: ALLIUM VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Onion ALLCE and garlic	All Allium		
Soil treatment				
Foliar treatment				

Table 5: PEAS AND BEANS

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Green grams and French beans or snow peas	All crops within the Crop group		
Soil treatment	French beans PHSSS or Snowpeas PIBSX			
Foliar treatment				

Table 6: UMBELLIFEROUS

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Carrot DAUCSA or coriander CORSA	All crops within the crop group		
Soil treatment				
Foliar treatment				

Table 7: FRUITING VEGETABLES OF SOLANACEAE

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Tomato LYPES	All crops within the crop group		
Soil treatment				
Foliar treatment				

Table 8: RHUBARB AND ASPARAGUS

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Rhubarb RHERH or Asparagus ASPOF	Rhubarb RHERH or Asparagus ASPOF		
Soil treatment				
Foliar treatment				

Table 9: ROOT/STEM TUBER VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Potato and sweet potato	All crops within the crop group		
Soil treatment				
Foliar treatment				

Table 10: CHENOPODIACEOUS VEGETABLES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables	Data on indicator crops that permits
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			reduced data on the indicator crops (or no data *)	extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Spinach BEAVV	All crops within the crop group		
Soil treatment				
Foliar treatment				

D. EXTRAPOLATION TABLES for EFFICACY of HERBICIDES

Table 1: WEEDS IN VEGETABLE BRASSICAS

Leafy brassicas: BRSOA kale *Brassica oleracea* var. *acephala* including collards and curly kale *Brassica oleracea* var. *sabellica* BRSOC; BRSPK Peking cabbage *Brassica pekinensis*; BRSCH *B. chinensis* [synonyms: *B. rapa* subsp. *chinensis*; *B. chinensis* var. *parachinensis*; *B. parachinensis*]; BRSNO Mitzuna *Brassica rapa* subsp. *nipposinica*; BRSPE Komatsuna *Brassica perviridis*; SINSP mustard *Sinapis* sp. (red, white brown black); DIPER Rockets *Diplotaxis erucoides* and ERUVE *Eruca vesicaria* subsp. *sativa*.

Head brassicas: (Head) Cabbage (includes red BRSOR *Brassica oleracea* var. *capitata* f. *rubra* and white *Brassica oleracea* var. *capitata* f. *alba* BRSOL); BRSON *Brassica oleracea* var. *capitata* f. *conica*; BRSOF Brussels sprouts *B. oleracea* var. *gemmifera*; BRSOS Savoy cabbage *B. oleracea* var. *sabauda*.

Flowerhead brassicas: (Flowering brassicas); BRSOB Cauliflower *B. oleracea* var. *botrytis* subvar. *cultiflora*, BRSOK Broccoli, Calabrese, cima di rapa *B. oleracea* var. *italic*; BRSAG Chinese kale (Chinese broccoli) *Brassica alboglabra*.

Root / Stem brassicas and radish crops: BRSNA Swedes *B. napus* var. *napobrassica*, BRSRR Turnips *B. rapa*, RAPSS Radishes *Raphanus* spp. (including red, white, Black Spanish radish); RAPS R Small radish *Raphanus sativus*; RAPS N Garden radish *Raphanus sativus* var. *niger*; ARWLA Horseradish *Armoracia lapathifolia*; BRSOG Kohlrabi, *B. oleracea* var. *gongylodes*.

Weed		Crop: Vegetable Brassicas		Crop: outside Vegetable Brassicas	
1*	2	3	4	5	6
		Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<u>Commelina benghalensis</u> , <u>Nicandra physalodes</u> , <u>Oxalis spp</u> , <u>Tagetes minuta</u> , , <u>Brassica napus</u> , <u>Portulaca oleracea</u> , <u>Datura stramonium</u> , <u>Digitaria scalarum</u> , <u>Setaria verticillata</u> <u>Cynodon dactylon</u> , <u>Eleusine indica</u> , <u>Echinochloa colona</u> , <u>Pennisetum clandestinum</u>	Dicotyledons Monocotyledons	Cabbage BRSOL or, Broccoli BRSOK, or Cauliflower BRSOB,	Leafy and flower head and head and root brassicas	Other similar growing crops	Other similar growing crops *

*It will be desirable to have efficacy data on atleast 4 broadleaved weeds in column 1 and atleast 2 annual grass weeds and one perennial grass weed for any product that would be extrapolated on dicotyledon and monocotyledon weeds . However, where efficacy data on other weeds are provided extrapolation would be applicable on the respective weed species

Table 2: WEEDS IN BETA CROPS

e.g. sugarbeet *Beta vulgaris subsp. altissima var. saccharifera* BEAVA, chard beet/ Leaf beet *Beta vulgaris subsp. vulgaris var. cicla* BEAVV, beet root *Beta vulgaris subsp. vulgaris var. conditiva* BEAVD, fodder beet *Beta vulgaris subsp. vulgaris var. crassa* BEAVC

W		Crop: within the <i>Beta</i> crops		Crop: outside the <i>Beta</i> crops	
1	2	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no)	6 Extrapolation to crops (reduced or no data*)
Amaranthus (<i>Amaranthus retroflexus</i>), Fat hen (<i>Chenopodium album</i>), Common Purslane (<i>Portulaca oleracea</i> , <i>Polygonium spp</i> , <i>Sonchus avennsis</i>	Dicotyledons	Any <i>Beta</i> species BEASS	Any <i>Beta</i> species BEASS		Spinach
Love grass <i>Setaria verticilata</i> , <i>Avena fatua</i> –	Monocotyledon				

Table 3: WEEDS IN BULB VEGETABLES (ALLIUM VEGETABLES)

ALLCE Onion *Allium cepa*, ALLAS Shallots *Allium cepa* *Aggregatum* types, ALLAH Silverskin onions *Allium ampeloprasum* f. *holmense*, ALLFI Welsh onion (Spring onion, Bunching onion) *Allium fistulosum*, ALLSC Chives *Allium schoenoprasum*, ALLSA Garlic *Allium sativum*, ALLPO Leek *Allium porrum*.

Weed		Crop: Bulb Vegetables		Crop: outside Bulb Vegetables	
1	2	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
Purslane (<i>Portulaca</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Goose grass (<i>Eleusine indica</i>) Wild oats (<i>Avena fatua</i>), Barnyard grass (<i>Echinochloa crusgalli</i>), Nutsedge (<i>Cyperus spp</i>)	Dicotyledon Monocotyledons Cyperaceae	Bulb onion or Garlic	All bulb vegetables	Any bulb flower or flower bulbs or leek ALLPO	Other similar growing crops

Table 4: WEEDS IN PEAS AND BEANS: *Pisum* spp. PIBSS, *Vicia* spp. VICSS, and *Phaseolus* spp. PHSSS

Weed		Crop: within the peas and beans		Crop: outside the peas and beans	
1	2	3 Indicator crops	4 Extrapolation to other crops	5 Data from these crops can support the indicator crops (reduced data or no data *)	6 Extrapolation to crops (reduced or no data*)
Pigweed (<i>Amaranthus</i> spp), Sowthistle (<i>Sonchus eraceae</i>), Mexican marigold (<i>Tagetes minuta</i>), Devil's thorn (<i>Emex australis</i>), Thorn apple (<i>Datura stramonium</i>), Macdonald's eye (<i>Galinsoga parviflora</i>), Black jack (<i>Bidens pilosa</i>), Nightshade (<i>Solanum nigrum</i> , <i>Oxalis</i> (<i>Oxalis</i> spp)	Dicotyledons	<i>Phaseolus</i> spp PHSSS or Any <i>Pisum</i> spp. PIBSS or <i>Vicia</i> spp. VICSS except <i>Vicia faba</i> VICFX	All <i>Pisum</i> spp. PIBSS, all <i>Phaseolus</i> spp. PHSSS, all <i>Vicia</i> spp. VICSS , Green grams , <i>Dolichos lablab</i> , cow pea <i>Vigna unguiculata</i>	Soybean GLXMA	Lupin LUPSS, soybean GLXMA

Table 5: WEEDS IN UMBELLIFEROUS CROPS: carrot DAUCA, celery APUGV, celeriac APUGR, fennel FOEVD, parsnip PAVSA, parsley PARCR, coriander CORSA and caraway CRYCA.

Weed		Crop: within the Umbelliferae		Crop: outside the Umbelliferae	
1	2	3	4	5	6
		Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Pigweed (<i>Amaranthus hybridus</i>), black jack (<i>Biden pilosa</i>), oxalis (<i>Oxalis latifolia</i>), chick weed (<i>Stellaria media</i> L) and Common lambsquarter (<i>Chenopodium album</i>), Crabgrass (<i>Digitaria sanguinalis</i>) Yellow nutsedge (<i>Cyperus esculentus</i> L.),					

Pigweed (<i>Amaranthus hybridus</i>), black jack (<i>Biden pilosa</i>), oxalis (<i>Oxalis latifolia</i>), chick weed (<i>Stellaria media</i> L) and Common lambsquarter (<i>Chenopodium album</i>),	Dicotyledon	Carrot ,	Any umbelliferous e.g Raddish ,	Parsley PARCR, coriander CORSA and caraway CRYCA.	
Crabgrass (<i>Digitaria sanguinalis</i>)	Monocotyledon				
Yellow nutsedge (Cyperus esculentus L.),	Cyperaceae				

E. EXTRAPOLATION TABLES FOR CROP SAFETY OF HERBICIDES

EXTRAPOLATION REGARDING PROTECTED/OUTDOOR SITUATIONS

Please note that where crops may be grown in both protected and field situations, and where significant differences are expected in pest relevance or crop agronomy between indoor and outdoor situations, it is important to generate a proportion of the data on crops grown in both situations to ensure the product has been tested under a suitable range of typical and challenging conditions.

Table 1: WEEDS IN BETA CROPS e.g. sugarbeet *Beta vulgaris* subsp. *altissima* var. *saccharifera* BEAVA, chard beet/ Leaf beet *Beta vulgaris*

subsp. vulgaris var. *cicla* BEAVV, beet root *Beta vulgaris subsp. vulgaris* var. *conditiva* BEAVD, fodder beet *Beta vulgaris subsp. vulgaris* var. *crassa* BEAVC

		Crop: within the <i>Beta</i> crops		Crop: outside the <i>Beta</i> crops	
1 Treat ment type		2 Indicator crops	3 Extrapolation to other crops	4 Data from these crops can support the indicator crops (reduced data or no data *)	5 Extrapolation to crops (reduced or no data*)
	Herbicide group				
Solanum spp, amaranthus (<i>Amaranthus retroflexus</i>), Rag weed (<i>Ambrosia artemisiifolia</i>), Fat hen (<i>Chenopodium album</i>), Common Purslane (<i>Portulaca oleracea</i> , <i>Polvaonium spp</i>	Broadleaved weed Herbicides	Beet root BEAVD	Any Beta species BEASS		
<i>convolvulus arvensis</i> , Love grass <i>Setaria verticillata</i> , <i>Avena fatua</i> – wild oats	Graminicides	Any Beta species BEASS	Any Beta species BEASS		

Table 2: VEGETABLE BRASSICAS (seeded and planted) a

Treatment type		Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
	Herbicide group	Crop	Crop	Crop	Crop
<u>Commelina bengalensis</u> , <u>Oxalis spp.</u> , <u>Brassica napus</u> , <u>Portulaca oleracea</u> , <u>Datura stramonium</u> , <u>Digitaria scalarum</u> , <u>Cynodon dactylon</u> , <u>Eleusine indica</u> , <u>Pennisetum clandestinum</u>	Broad-spectrum herbicides ⁱ	Cauliflower BRSOB or broccoli BRSOK or cabbage BRSCH	Leafy ⁱ , flower head, head,	Leafy, flower head, head,	
		Any root brassica	root brassicas		
	Graminicides	Any vegetable brassica	Leafy, flower head, head, root brassicas	Leafy, flower head, head, root brassicas	oilseed rape BRSNN

ⁱ It is possible to extrapolate from sown to planted brassicas, but not vice versa.

ⁱ Broad-spectrum herbicides include herbicides with any broad-leaved weed activity.

Table 3: BULB VEGETABLES (seeded and planted) b

	Crop: bulb vegetables	
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1		2 ⁱ	3	4 ⁱ	5 ⁱ
Treatment type		Indicator crops within the crop group	Extrapolation to other crops within the group	Extrapolation from crops outside this crop group that enables reduced or no data* on the indicator crops	Extrapolation to crops outside the crop group with reduced or no data*
	Herbicide group				
Purslane (<i>Portulaca Oleraceae</i>) Double thorn (<i>Oxygonum sinuatum</i>) Devil's thorn (<i>Emex australis</i>) Thorn apple (<i>Datura stramonium</i>)	Broad-spectrum herbicides ⁱ	Bulb onion or Garlic under protected conditions	Same specific bulb vegetable in the field		Leek ALLPO
Goose grass (<i>Eleusine indica</i>) Wild oats (<i>Avena fatua</i>), Barnyard grass (<i>Echinochloa crusgalli</i>), Nutsedge (<i>Cyperus spp</i>)	Graminicides	Any seeded bulb vegetable crop	Transplanted onion ALLCE and shallot ALLAS	Leek, ALLPO, Subgroup 009B (Codex groups)	Leek ALLPO

Generally direct seeded crops are more sensitive to phytotoxicity compared to transplanted crops

ⁱ For the purpose of this extrapolation table, 'Bulb Vegetables' are defined as: garlic, bulb onion, shallot, salad onion.

ⁱ Note that it is commonly preferable to have data on several of the crops within the crop group, but data on the indicator crop should be available.

ⁱ Column 5 identifies whether data from other crops against the same weed may enable a reduction in the amount of data required on the indicator crop (or no data on the indicator crop if the other crop is marked with an asterisk (*)). If this column is blank, the use of data from other crops is not possible/relevant.

ⁱ Where extrapolation to other crops or crop groups is acceptable, then this is indicated in column 6. In column 6 crops marked with an asterisk (*) indicate that no data are required if appropriate data on the indicator crop is present. Note that column 6 is optional and should only be added to, or applied when there are clear possibilities for extrapolation to other crop groups.

Table 4: PEAS AND BEANS *Pisum* spp. PIBSS, *Vicia* spp. VICSS, and *Phaseolus* spp. PHSSS , Pigion pea

		Crop: within the peas and beans		Crop: outside the peas and beans	
1		2	3	4	5
Treatment type		Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
	Herbicide group				
Devil's thorn (<i>Emex australis</i>), Thorn apple (<i>Datura stramonium</i>), Macdonald's eye (<i>Galinsoga parviflora</i>),	Broadleaved weed herbicides	<i>Vicia faba</i> VICFX	All <i>Vicia</i> spp. VICSS	Soybean GLXMA	Lupin LUPSS, soybean GLXMA
Black jack (<i>Bidens pilosa</i>), Nightshade (<i>Solanum nigrum</i> , <i>Oxalis</i> (<i>Oxalis</i> spp))	Broadleaved weed herbicides	<i>Phaseolus vulgaris</i> PHSVX	All <i>Phaseolus</i> spp. PHSSS, Cow peas, Green grams, <i>Dolichos lablab</i> , Pigeon pea (<i>Cajanus cajan</i>)	Soybean GLXMA	Lupin LUPSS, soybean GLXMA
Pig weed (<i>Amaranthus</i> spp), Sow thistle (<i>Sonchus oleraceae</i>), Mexican marigold (<i>Tagetes minuta</i>),	Broadleaved weed herbicides	<i>Pisum sativum</i> PIBSX	All <i>Pisum</i> spp. PIBSS	Soybean GLXMA	Lupin LUPSS, soybean GLXMA
Crabgrass (<i>Digitaria</i> spp), Barnyard grass (<i>Echinochloa crusgalli</i>), Nutsedge (<i>Cyperus</i> spp),	Graminicides	Any pea or bean	All peas and beans	Soybean GLXMA	Lupin LUPSS, soybean GLXMA

Table 5: UMBELLIFEROUS CROPS: carrot DAUCA, celery APUGV, celeriac APUGR, fennel FOEVD, parsnip PAVSA, parsley PARCR, coriander CORSA, and caraway CRYCA.

		Crop: within the umbelliferous crops		Crop: outside the umbelliferous crops	
1		2	3	4	5
Treatment type		Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
	Herbicide group				
Pigweed (<i>Amaranthus hybridus</i>) Black jack (<i>Bidens pilosa</i>) oxalis (<i>Oxalis latifolia</i>) Common lambsquarter (<i>Chenopodium album</i>)	Broadleaved weed herbicides	Carrot (DAUCA) and Parsnip (PAVSA) or Coriander (CORSA)	All umbelliferous crops (1UMBF)		
Crabgrass (<i>Digitaria sanguinalis</i>) Yellow nutsedge (<i>Cyperus esculentus</i>).	Graminicides	Carrot and any other umbelliferous crop	All umbelliferous crops		

F. GENERIC EXTRAPOLATION TABLE FOR EFFECTIVENESS OF NEMATICIDES ON VEGETABLES

► NEMATODES

INTRODUCTION

The table provides detailed lists of acceptable extrapolations, for the regulatory authority and applicants, in the context of the registration of plant protection products. The table should be used in conjunction with the crop safety extrapolations. It is important to ensure that expert judgment and regulatory experience are employed when using these tables.

The scope for extrapolation may be extended as data and experience with a certain plant protection product increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of target biology may be a relevant factor, either in extrapolating to other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure etc. should be considered.

TABLE FORMAT

The main pest species are listed in Column 1 (although this is not exhaustive), and the pest group to which they belong is specified in Column 2. Companies may choose if they wish to provide data only for individual named species, which would then appear individually listed on the label. But underlined species have been identified as key major targets and as such it is advisable to generate data on these. Furthermore, data on these species then allow a claim to be made for the whole pest group (as specified in Column 2), if required. If a claim for the whole pest group is required but there is no underlined species, then data must be generated on all listed species. Column 3 indicates the key indicator crop(s). In some instances this may be only one specified crop. In other cases, when separated by an 'or', the company may choose from a range of alternatives within the group. Data generated on crops in Column 3 may be used to extrapolate to all crops listed in Column 4.

NEMATODES		Crops	
1 Pest species	2 Pest group name	3 Indicator crops Data from any other relevant crop, if available, can support (reduced data) the indicator crop(s)	4 Extrapolation to other crops or crop groups
Any relevant species among: <i>Meloidogyne</i> sp. MELGSP (e.g. <i>M. hapla</i> MELGHA or <i>M. incognita</i> MELGIN, <i>M. chitwoodi</i> MELGCH, <i>M. fallax</i> MELGFA, <i>M. arenaria</i> MELGAR, <i>M. javanica</i> MELGJA)	Root knot nematodes (indoor)	Tomato LYPES, <i>Phaseolus vulgaris</i> PHSVX or Spinach, BEAVV or Cucumber CUMSA, or Melon CUMME	All other relevant indoor vegetables
Any relevant species among: <i>Meloidogyne</i> sp. MELGSP (e.g. <i>M. hapla</i> MELGHA or <i>M. incognita</i> MELGIN, <i>M. chitwoodi</i> MELGCH, <i>M. fallax</i> MELGFA, <i>M. arenaria</i> MELGAR, <i>M. javanica</i> MELGJA)	Root knot nematodes (outdoor)	<i>Phaseolus vulgaris</i> PHSVX or Spinach, BEAVV or Carrot or Potatoes or Tomatoes	All other relevant outdoor vegetables
<i>Pratylenchus penetrans</i> PRATPE	Root lesion nematodes	Potato SOLTU or Carrot DAUCS	All other vegetables
Any relevant species among: <i>Trichodoridae</i> spp. 1TRIHF <i>Pratylenchus</i> spp. 1PARAG <i>Rotylenchus</i> spp. 1ROTLG	Free living (Ectoparasitic) nematodes	Carrot DAUCS or Onion ALLCE or Leek or Potatoes SOLTU	All other vegetables
<i>Globodera rostochiensis</i> HETDRO or <i>G. pallida</i> HETDPA	Cyst nematodes	Potato SOLTU	All other relevant vegetables
		Tomato LYPES	
<i>Heterodera carotae</i>	Cyst nematodes	Carrot DAUCS	All other relevant vegetables
<i>Ditylenchus dipsaci</i> DITYDI	Stem and bulb nematodes	Onion ALLCE or Field bean VICFX or Garlic ALLSA or Alfalfa MEDSA or Carrot DAUCS	Any other relevant vegetables

Relevant* All vegetables attacked by respective species of nematodes

B. CEREALS

Extrapolation Tables For Efficacy Of Pest Control Products

Introduction

The table provides detailed lists of acceptable extrapolations organized by crop groups, for the regulatory authority and applicants, in the context of the registration of pest control products. It is important to ensure that expert judgment and regulatory experience are employed when using these tables. The tables should be used in conjunction with the above guidelines.

The scope for extrapolation may be extended as data and experience with a certain plant protection products increases. The applicant should always provide appropriate justification and information to support the proposed extrapolation. For example, comparability of biology of the target pest may be a relevant factor, either in extrapolating to other target species or for the same target onto another crop. For crops, factors such as comparable growth habit, structure among others should be considered.

Table format

The main pest species for the crop group are listed in Column 1 (although this is not exhaustive), and the pest group to which they belong is specified in Column 2. Companies may choose if they wish to provide data only for individual named species, which would then appear individually listed on the label. But underlined species have been identified as key major targets and as such it is advisable to generate data on these. Furthermore, data on these species then allow a claim to be made for the whole pest group (as specified in Column 2), if required. If a claim for the whole pest group is required but there is no underlined species, then data must be generated on all listed species.

Column 3 indicates the key indicator crop(s) for the crop group. In some instances this may be only one specified crop. In other cases, when separated by an 'or', the company may choose from a range of alternatives within the group. Data generated on crops in Column 3 may be used to extrapolate to all crops listed in Column 4. However, it is preferable to have data on several of the crops within the crop group, but data on the indicator crop should be available.

Column 5 identifies whether data on other crops against the same target may help to reduce the amount of required data on the indicator crop. It may be possible for a direct extrapolation without the need for further data on the indicator crop (marked with an asterisk (*)). However, this is dependent on the extent of available data and similarity of crop/target biology. The company should provide an

appropriate reasoned case when wanting to use supporting data from other crop groups.

Column 6 gives examples of acceptable extrapolations for a particular pest claim onto other crops. This is not a comprehensive list. Whether extrapolation may be direct (no data, marked with an asterisk (*)), or require additional supporting data on the other crop, will again be dependent on the extent and relevance of the existing database and companies should provide an appropriate reasoned case.

Extrapolation regarding protected/outdoor situations

Please note that where crops may be grown in both protected and field situations, and where significant differences are expected in pest relevance or crop agronomy between indoor and outdoor situations, it is important to generate a proportion of the data on crops grown in both situations to ensure the product has been tested under a suitable range of typical and challenging conditions.

A. EFFECTIVENESS OF PEST CONTROL PRODUCTS IN CEREALS

Barley, Maize, Rice, Oat, Rye, Sorghum, Wheat, Millet, Popcorn, Baby corn and Sweet corn

TABLE 1: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF HERBICIDES

Weed		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Weeds	Weed group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Oxalis latifolia</i> L. <i>Oxygonium sinuatum</i> Hochst <i>Erucastrum arabicum</i> Fisch. & C.A. Mey. <i>Amaranthus hybridus</i> L. <i>Nicandra physalodes</i> L. <i>Datura stramonium</i> L. <i>Bidens pilosa</i> L. <i>Commelina benghalensis</i> L. <i>Tagetes minuta</i> L.	Broad leaf weeds	Maize	Sorghum Popcorn Sweet corn Baby corn	Other similar growing crops (Pigeon pea, Sunflower, sugarcane-plant crop)	Other similar growing crops (Pigeon pea, Sunflower, sugarcane-plant crop)

<i>Euphorbia esula</i> L. <i>Emex spinosus</i> L <i>Tagetes patula</i> L. <i>Galinsoga parviflora</i> L. <i>Striga hermonthica</i> De Benth					
<i>Avena fatua</i> L. <i>Eleusine indica</i> L. <i>Setaria verticillata</i> (L.) P. Beauv <i>Digitaria scalarum</i> (Schweinf.) Chiov.	Grasses				
<i>Cyperus species</i>	Sedges				

<i>Polygonum convolvulus</i>	Broad leaf weeds	Wheat or Barley	Barley		
<i>Bidens pilosa</i>			Oats		
<i>Nicandra pysalodes</i>			Rye		
<i>Gallium spurium</i>			Upland rice		
<i>Oxygonum sinucutum</i>			Millet		
<i>Galinsonga paviflora</i>			Triticale		
<i>Polygonum aviculare</i>			wheat		
<i>Chenopodium album</i>					
<i>Capsela bursa pastoris</i>					
<i>Physalis ixorcarpa</i>					
<i>Malva verticilatta</i>					
<i>Tagetes minuta</i>					
<i>Solanum nigrum</i>					
<i>Amaranthus hybridus</i>					
<i>Brassica napus</i>					
<i>Brassica campestris</i>					
<i>Raphanus raphanistrum</i>					
<i>Bromus sterilis</i>	Grasses		Barley		Pseudocereals

<i>Setaria verticilatta.</i> <i>Setaria pumila</i> <i>Avena fatua</i> <i>Eleusine indica</i> <i>Cynodon spp.</i>			Oats Rye Upland rice Millet Triticale		
<i>Cyperus species</i>	Sedges		Barley Oats Rye Upland rice Millet Triticale		
<i>Ludwigia adscendens</i> <i>Monochoria vaginalis</i> <i>Ludwigia octavalis</i> <i>Ammania coccinea</i> <i>Commelina diffusa</i> <i>Marsilea minuta</i>	Broad leaf weeds	Paddy rice**			Arrow root Taro

<i>Spharanthus cyakuloides</i>					
<i>Alternanthera sessilis</i>					
<i>Sphaeranthus africanus</i>					
<i>Eclipta prostrata</i>					
<i>Leptochloa chinensis</i>	Grasses	Paddy rice**			Arrow root
<i>Echinochloa colona</i>					Taro
<i>Leersia hexandra</i>					
<i>Echinocloa crusgalli</i>					
<i>Cyperus difformis</i>	Sedges				Arrow root
<i>Bolboschoenus maritimus</i>					Taro
<i>Cyperus rotundus</i>					

Note: spp. represents more than one species in that genus

*Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).

**Weed species are specific to paddy rice and cannot be extrapolated to upland rice or any other cereals.

TABLE 2: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF INSECTICIDES AND AVICIDES

Pest	Crop: within cereals	Crop: outside cereals
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1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Spodoptera exempta</i>	African armyworm	Maize	Sweet corn Sorghum Baby corns Rice	Sugarcane Cotton Soybeans Groundnuts Peanuts Tobacco	
<i>Spodoptera frugiperda</i>	Fall armyworm	Maize	Sweet corn Sorghum Baby corns Rice	Sugarcane Cotton Soybeans Groundnuts Peanuts Tobacco	

<i>Busseola fusca</i> <i>Chilo</i> spp.	Stem borer/ Stalk borer	Maize	Sweet corn Baby corns Sorghum Rice	Sugarcane	
<i>Rhopalosiphum maidis</i>	Aphids	Sweet corn/Maize	Popcorns Sorghum Baby corn Sweet corn Maize	Sugarcane <i>Phaseolus</i> spp. <i>Pisum</i> spp. Solanaceae	
<i>Macrotermes</i> spp. <i>Coptotermes</i> spp. <i>Odontotermes</i> spp..	Termites	Maize	Sweet corn Popcorns Baby corns Upland rice Sorghum	Sugarcane Pigeon peas Cotton Groundnuts Tobacco Beans	
<i>Cicadulina mbila</i>	Leaf hoppers	Maize	Sweet corn Popcorns	Sugarcane	

			Baby corns Rice		
<i>Frankliniella</i> spp.	Thrips	Maize	Sweet corn Popcorns Baby corns	Pigeon peas Cotton	
<i>Heliothis</i> (<i>Helicoverpa</i>) <i>armigera</i>	African bollworm	Maize	Sorghum Sweet corn Popcorns Baby corns	Tobacco Cotton	
<i>Agrotis</i> spp.	Cut worms	Maize	Sweet corn Popcorns Baby corns Sorghum	Amaranth Pigeon pea	
<i>Spodoptera exempta</i>	African armyworm	Wheat	Barley Oats Rye Rice	Sugarcane	Pseudocereals

			Millet Triticale		
<i>Spodoptera frugiperda</i>	Fall armyworm	Wheat	Barley Oats Rye Rice Millet Triticale	Sugarcane	Pseudocereals
<i>Diuraphis noxia</i>	Russian wheat Aphids	Wheat	Barley Oats Rye Upland rice Millet Triticale		
<u><i>Rhopalosiphum padi</i></u> ; <i>R. maidis</i> ; <i>Metopolophium dirhodum</i>	Other aphids	wheat	Barley Oats Rye		

			Upland rice Millet Triticale		
<i>Agrotis</i> spp.	Cut worms	Wheat	Barley Oats Rye Upland rice Millet Triticale	Tobacco Cotton	Pseudocereals
<i>Haplothrips</i> spp. <i>Megalurothrips sjostedti</i> <i>Frankliniella</i> spp.	Thrips	Wheat	Barley Oats Rye Upland rice Millet Triticale	Pigeon pea Cowpea Cotton	Pseudocereals
<i>Petrobia latens</i>	Mites	Wheat	Barley Oats		Pseudocereals

			Rye Triticale Rice		
<i>Heliothis (Helicoverpa) armigera</i>	African bollworm	Wheat	Oat Barley Triticale	Tobacco Cotton Sunflower	
<i>Nezara viridula</i>	Green stink Bugs	Wheat	Rice Barley	Soybean Pepper Beans	
<i>Quelea quelea</i>	Weaver birds	Wheat/Sorghum	Barley Rye Millet Wheat Sorghum Oat Rice	Sunflower	Sunflower

			Triticale		
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Note: For seed treatment extrapolation refer to table 4; spp. represents more than one species in that genus

***Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).**

TABLE 3: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF INSECTICIDE FOR STORAGE PESTS

Pest		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
<i>Prostephanus truncates</i> <i>Sitophilus</i> spp. <i>Rhyzopertha dominica</i> <i>Sitotroga cerealella</i> <i>Tribolium castaneum</i>	Storage pests	Wheat	Rye Oats Barley Millet Rice	Cassava Yams	Pseudocereals

<i>Prostephanus truncates</i> <i>Tribolium castaneum</i> <i>Sitophilus spp.</i> <i>Rhyzopertha dominica</i> <i>Sitotroga cerealella</i>	Storage pests	Maize	Popcorn Sorghum Sweet corn	Cassava Yams	
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Note: spp. represents more than one species in that genus

***Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).**

TABLE 4: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF PEST CONTROL PRODUCTS FOR SEED TREATMENT

Pest		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or	Extrapolation to crops (reduced or no data*)

				no data *)	
<i>Macrotermes</i> spp. <i>Coptotermes</i> spp. <i>Odontotermes</i> spp.	Termites	Wheat	Rye Oats Barley Millet Rice	Cotton	Pseudocereals
<i>Agrotis</i> spp.	Cut worms	Wheat	Rye Oats Barley Millet Rice	Tomatoes Kales Cotton Beans Cabbages	Pseudocereals
<u><i>Schizonycha</i> spp.</u> <i>Aeolus</i> spp.	<u>Chafer grubs**</u> Wire worm	Wheat	Rye Oats Barley Millet Rice	Tomatoes Carrots beans Peas Cucurbits	Pseudocereals

<i>Macrotermes</i> spp. <i>Coptotermes</i> spp. <i>Odontotermes</i> spp	Termites	Maize	Popcorn Sorghum Sweet corn	Cotton	
<i>Agrotis</i> spp.	Cut worms	Maize	Popcorn Sorghum Sweet corn	Tomatoes Kales Cotton Beans Cabbages	
<i>Schizonycha</i> spp. or <i>Hereronychus arator</i> <i>Aeolus</i> spp.	<u>Chafer grubs or</u> <u>African black</u> <u>beetles**</u> Wire worms	Maize	Popcorn Sorghum Sweet corn	Peas Tomatoes Carrots beans Peas Cucurbits	
<i>Atherigona soccata</i>	shootfly	Sorghum	Barley		
<i>Pythium</i> spp. <i>Rhizoctonia</i> spp. <i>Fusarium</i> spp.	root rots	Wheat	Oats Rye Barley	Leafy vegetables Carrots Cucurbits	Pseudocereals

				<i>Allium</i> spp.	
<i>Pythium</i> spp.	Stalk rot	Maize/baby corn	Popcorn		
<i>Fusarium</i> spp.			Maize		
<i>Anthraco</i> spp.			Sweet corn		
<i>Botryodiplodia</i> spp.			Baby corn		

Note: spp. represents more than one species in that genus

*Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).

** Data on chafer grub or African black beetles can be extrapolated to wire worm

TABLE 5: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF FUNGICIDES

Pest		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Pathogen species	Disease group name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)

<i>Puccinia graminis</i>	Stem rust	Wheat	Barley Triticale Rye		
<i>Puccinia striiformis</i> <i>Puccinia triticina</i> <i>Puccinia hordei</i> <i>Puccinia recondita</i>	Yellow rust Leaf rust	Wheat	Barley Rye Triticale		
<i>Ustilago nuda</i>	Loose smut	Wheat	Barley		
<i>Fusarium graminearum</i>	Fusarium head blight/Scab	Wheat	Barley Rye		
<i>Septoria tritici</i> <i>Septoria nodorum</i>	Septoria leaf spots/blotch	Wheat	Barley Oats		
<i>Parastagonospora nodorum</i>	Glume blotch	Wheat	Triticale Barley		
Barley yellow dwarf virus	Barley yellow dwarf disease	Wheat	Barley Oats	Maize	Pseudocereals

			Triticale Rice Rye		
<i>Erysiphe graminis</i>	Powdery mildew	Wheat	Barley		
<i>Microdochium oryzae</i>	Scald	Wheat	Rice Barley Rye		
<i>Pyrenophora teres</i>	Net blotch	Barley	Wheat Oats		
<i>Physoderma maydis</i>	Brown spot	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Cercospora zeae</i> <i>Leptosphaeria</i> spp. <i>Curvularia</i> spp.	leaf spots	Maize/baby corn	Popcorn Maize Sweet corn		

			Baby corn		
<i>Ustilago maydis</i> <i>Sphacelotheca reiliana</i>	Smut	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Puccinia sorghi</i> <i>Puccinia polysora</i> <i>Physopella zeae</i>	Rusts	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Exsehilum turcicum</i>	Northern leaf blight	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Helminthosporium maydis</i>	Southern leaf blight	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		

<i>Maize chlorotic mottle virus</i> <i>Sugarcane mosaic virus</i>	Maize lethal necrosis disease* (aphids, thrips, beetles and rootworms as vectors)	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
Maize streak Virus	Maize streak disease* (leafhoppers as vectors)	Maize/baby corn	Popcorn Maize Sweet corn Baby corn		
<i>Peronosclerospora</i> spp. <i>Sclerophthora</i> spp.	Downy mildew	Maize/baby corn	Popcorn Maize Sweet corn Baby corn Sorghum	Sugarcane	
<u><i>Aspergillus</i> spp.</u> <i>Penicilium</i> spp. <i>Gibberella</i> spp. <i>Diplodia</i> spp.	Ear rots	Maize/baby corn	Popcorn Maize Sweet corn Baby corn	Cotton Groundnuts	

<i>Fusarium</i> spp					
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Note: spp. represents more than one species in that genus; Control of viral diseases the focus will be on the vectors

*Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).

TABLE 6: EXTRAPOLATION TABLE FOR EFFECTIVENESS OF NEMATICIDES

Pest		Crop: within cereals		
1	2	3	4	5
Pest species	Pest group name	Indicator crops	Extrapolation to other crops	Data from these crops on the same pathogen can support the indicator crops (reduced data or no data *)
<i>Pratylenchus</i> spp.	Lesion nematodes	Wheat or maize	Barley Rye Oats Sorghum Rice	Bananas

			Wheat Maize	
<i>Meloidogyne</i> spp.	Root knot nematodes	Wheat or maize	Barley Rice Rye Sorghum Oats Wheat Maize	Tomatoes Spinach Beans Night shade
<i>Anguina tritici</i>	Ear cockle of wheat	Wheat	Rye Triticale	

Note: spp. represents more than one species in that genus

***Reduced or no data may be required on case by case basis depending on robustness of data, whether the pest is a major pest on the crop or either the symptoms manifest better on this crop (for column 5).**

B. CROP SAFETY

EXTRAPOLATION TABLES FOR CROP SAFETY: FUNGICIDES, HERBICIDE AND INSECTICIDES IN CEREALS

The extrapolation tables should be used in conjunction with efficacy extrapolation guidelines. The tables provide detailed lists of acceptable extrapolations organized by crop groups for the regulatory authority and applicants in the context of the registration of plant protection products for minor uses. It is important to ensure that expert judgment and regulatory experience are employed when using

these tables. The regulatory authority excludes liability as to the reliability of the information provided through these tables.

For seed treatments, indicator crops should include seeds of similar or smaller size. Specific trials with insecticides and fungicides are not essential for foliar treatment. Observations in efficacy or residue trials are usually acceptable. For seed treatment a germination study on the indicator crop is usually necessary.

TABLE 7: EXTRAPOLATION TABLE FOR CROP SAFETY OF HERBICIDES

Treatment type		Crop: within cereals		Crop: outside cereals	
1	2	3	4	5	6
Treatment type	Herbicide group	Indicator crops	Extrapolation to other crops	Data from these crops can support the indicator crops (reduced data or no data *)	Extrapolation to crops (reduced or no data*)
Pre-emergence	Broad leaf weed herbicides	Baby corn and maize	Popcorn Sweet corn Maize Baby corn		
Post-emergence					
Pre-emergence	Broad leaf weed herbicides	Wheat and Barley	Oats Rye		

			Upland rice		
Post-emergence			Millet		
			Triticale		

Note: Extrapolation for graminicides and sedges is not possible.

For sorghum, specific studies for post-emergence and pre-emergence herbicides are required.

Extrapolation is applicable within the same method of application only (Pre- or post- emergence application).

TABLE 8: EXTRAPOLATION TABLE FOR CROP SAFETY OF FUNGICIDES AND INSECTICIDES

Treatment type	Indicator crops	Extrapolation to other crops	Data from other crops (or crop groups) that enables reduced data on the indicator crops (or no data *)	Data on indicator crops that permits extrapolation to other crops (or crop groups) with reduced data (or no data *)
Type of application	Crop	Crop	Crop	Crop
Seed treatment	Baby corn or Maize	Popcorns		
Soil treatment		Sweet corn		
Foliar treatment		Baby corn		

		Maize Sorghum		
Seed treatment	Wheat or barley	Oats		
Soil treatment		Wheat		
Foliar treatment	Wheat and barley	Barley Rye Triticale		

C. HERBS AND SPICES

Efficacy and Crop Safety guidelines

Indicator pests and representative commodities for extrapolation of efficacy data in herbs and spices commodity group

Representative commodities within herb or spices group were selected based on principles of data extrapolation in the EPPO guidelines. Recognizing that herbs and spices are minor crops, major vegetable groups with some similarities to herbs and spices were identified as indicator crops. Pests and diseases were also identified in the indicator crops as representative species for the efficacy trials. Data generated for the identified vegetables/pest combination can be used for extrapolation to various herbs and spices in column 6 in the vegetable extrapolation tables for vegetables. For details, refer to the extrapolation tables.

Herbs and spices may have different growth habit, canopy sizes and GAPs from the representative indicator crops in the efficacy tables. In order to ensure adequate coverage of the crop with the pesticide during application and to reduce incidences of residues, applicants are advised to carry out calibrations for the various herbs and spices to establish appropriate spray volumes per hectare. This information will be used together with the dosage established through efficacy trials on the representative crop and species for extrapolation.

Indicator pests and representative commodities for extrapolation of crop safety data in herbs and spices commodity group (herbicides, fungicides, insecticides, seed treatment, etc.)

Phytotoxicity is particularly relevant to certain products such as herbicides, some types of applications and for specific crops. It can vary considerably between different crop species, cultivars of the same crop, and between different plant protection products. Crop safety extrapolation is possible in some situations, but should be well reasoned in extrapolating from vegetables to herbs. Extrapolation may not be possible where use of the product has resulted in crop damage on some crops or cultivars where the crops concerned are significantly different, or when a crop is known to be particularly sensitive. The following principles are important to consider;

1. Method of application should be similar.
2. Availability and interpretation of evidence of crop safety.
3. Taxonomic relationship and similarity in morphology.
4. Availability of adequate crop safety data showing a good margin of safety in vegetables for extrapolation to herbs and spices.

N/B: For details on crop safety extrapolation for fungicides, herbicides, insecticides, etc, refer to the extrapolation tables for vegetables.