

# EFFICACY REQUIREMENTS FOR PLANT PROTECTION PRODUCTS USED ON ORNAMENTAL PLANTS

**Data requirements for obtaining an authorisation for a plant protection product in ornamental plants**



## CONTACT

FPS Health, Food Chain Safety and Environment  
Service Plant protection products and Fertilising products  
Avenue Galilée 5/2  
1210 Brussels  
BELGIUM

Web: [phytowebe.be](http://phytowebe.be)

Tel.: +32 (0)2 524 97 97 (call centre FPS)

Email: [phytowebe@health.fgov.be](mailto:phytowebe@health.fgov.be)

Contact form: [phytowebe.be/en/contact](http://phytowebe.be/en/contact)

## DOCUMENT INFORMATION

Efficacy requirements for plant protection products used on ornamental plants

*Version 1.0*

*03/01/2023*

# REVISION HISTORY

Version and date	Point	Changes
Version 1 January 2023	Not applicable	Not applicable

---

# TABLE OF CONTENTS

---

1. Introduction .....	5
2. Definitions.....	5
3. Data requirements biological dossier .....	8
3.1. Biological dossier of fungicides.....	9
3.2. Biological dossier of acaricides .....	15
3.3. Biological dossier of insecticides .....	16
3.4. Biological dossier of other pests.....	24
3.5. Biological dossier of herbicides .....	25
3.6. Biological dossier of growth regulators .....	28
3.7. Biological dossier of nematocides.....	30
3.8. Biological dossier of bactericides.....	31
3.9. Biological dossier of molluscicides.....	32

# 1. Introduction

In Belgium, ornamental plants are cultivated on a limited acreage of only 515 ha for protected crops and 5060 ha for crops grown in the field. Ornamental plants are therefore considered 'minor crops' by the Authorisation Board compared with 'major crops' such as maize, wheat and beets.

As it is generally not cost-effective for the phyto-pharmaceutical industry to apply for authorisations for the use of plant protection products in minor crops, the authorisations in ornamental plants are mostly obtained by applications introduced by third parties (research stations, growers organisations, ...). The authorisation holders are however also invited to submit applications for use extensions in ornamental plants. More information on how to apply for a minor use extension according to Art. 51 of Regulation (EC) No 1107/2009<sup>1</sup> is available on [phytoweb.be](http://www.phytoweb.be).

The data requirements and the risk evaluation for formulations are defined in Regulation (EC) No 1107/2009. However, some risk assessments are covered by the risk envelope of the main authorisation. These assessments are therefore not relevant and can thus be waived.

## 2. Definitions

Any reference in this document to 'ornamentals' shall be understood to mean ornamental plants which are not intended for human consumption or animal feed.

The various ornamental crops are organized in a hierarchical structure. This structure with the different subgroups is shown in Table 1. Products which have been authorised for use in a higher rank may also be used in a lower rank. For example, products authorised for use in 'Ornamental broadleaf trees and shrubs', may also be used for use in 'Azalea' (*Azalea* spp.), 'roses' (*Rosa* spp.) and 'box' (*Buxus* spp.).

Plant protection products which are authorised for use in 'ornamental trees and shrubs' may only be used for trees and shrubs grown in a 'cultivated, artificial ecosystem'. All types of tree and shrub nurseries are included in this definition, including **nurseries of fruit trees and shrubs** provided that:

- no fruit is harvested (after all, these products are authorised for crops that are not intended for consumption);
- the fruit trees and shrubs are not yet planted on their final position.

---

<sup>1</sup>Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing on the market of plant protection products and repealing Council Directives 79/117/EEC and 91/414/EEC.

The following crops do not belong hierarchically to the group 'ornamentals', but specific authorisations can be granted for these uses:

- **'Lawns and recreational fields (except golf courses)'** and **'golf courses'**. The production of turf rolls is included in the crop 'lawns and recreational fields (except golf courses)'. As none of these crops may enter the food chain, grazing or haying is not allowed.
- **'Forestry'**. Products authorised in this crop are mainly used during or shortly after the planting of forests. Products authorised in ornamental trees and shrubs may not be used in forestry.
- **'Seeds of ornamentals'**. Authorisations granted for this crop can only be used for seed treatment before planting. The treated seeds must not be used for feed or food after treatment.
- Stored ornamentals such as **'Cut flowers (post harvest)'**, **'Potplants (post harvest)'** and **'Bulbs and tuber flowers (post harvest)'**. Authorisations granted for these crops can only be used after harvest, e.g. to extend the shelf life. The crops must not be used for feed or food after treatment.
- **'Cuttings (ornamentals)'**. The treated cuttings must not be used for feed or food after treatment.
- **'Marigold (anti-eelworms)'** (*Tagetes* spp.). This crop can only be used for nematod control.
- **'Mallow'** (*Malva* spp.), **'jasmine'** (*Jasminum officinale*), **'rose geranium'** (*Pelargonium graveolens* and *P. capitatum*), **'cinquefoil'** (*Potentilla* spp.) and **'common periwinkle'** (*Vinca minor*). Authorisations granted for these crops can only be used when these crops are grown for industrial purposes (e.g. oil extraction). The treated plants must not be used for feed or food after treatment.

Table 1: Hierarchical structure of ornamentals (not for human consumption or animal feed).

Crop name			Examples
<b>Ornamentals</b>	<b>Plantes ornementales</b>	<b>Sierplanten</b>	
<b>Ornamental trees and shrubs</b>	<b>Arbres et arbustes ornementaux</b>	<b>Sierbomen en -heesters</b>	
Conifers (ornamentals)	Résineux ornementaux	Coniferen (sierbomen)	e.g. <i>Abies</i> , <i>Araucaria</i> , <i>Pinus</i> , <i>Chameaciparis</i> , <i>Cedrus</i> , <i>Tsuga</i> , <i>Gingko</i>
Christmas trees	Sapins de Noël	Kerstsparen	
Ornamental broadleaf trees and shrubs	Arbres et arbustes feuillus ornementaux	Loofbomen en -heesters (sierbomen)	e.g. <i>Azalea</i> , <i>Rosa</i> , <i>Platanus</i> , <i>Catalpa</i>
Azalea	Azalée	Azalea	<i>Azalea</i> spp.
Roses	Rosiers	Rozen	<i>Rosa</i> spp.
Box	Buis	Buxus (palmboompje)	<i>Buxus</i> spp.
Erica and calluna	Erica et calluna	Erica en calluna	<i>Ericaceae</i>
<b>Ornamentals (not woody)</b>	<b>Plantes ornementales non ligneuses</b>	<b>Sierplanten (niet houtachtig)</b>	
Ornamentals (not woody, perennial)	Plantes vivaces ornementales non ligneuses	Sierplanten (doorlevend, niet houtachtig)	e.g. <i>Fuchsia</i> , <i>Hedera</i> , <i>Helleborus</i>
Bulbs and tuber flowers (ornamentals)	Fleurs à bulbes, à tubercules et à rhizomes	Bloembollen, –knollen en -rhizomen	e.g. <i>Allium</i> , <i>Amaryllis</i> , <i>Anemone</i> , <i>Begonia</i> , <i>Crocus</i> , <i>Cyclamen</i> , <i>Dahlia</i> , <i>Freesia</i> , <i>Galanthus nivalis</i> , <i>Gladiolus</i> , <i>Hippeastrum</i> , <i>Hyacinthus</i> , <i>Iris</i> , <i>Lilium</i> , <i>Narcissus</i> , <i>Ranunculus</i> , <i>Tulipa</i>
Tuberous begonia	Bégonias tubéreux	Knolbegonia	<i>Begonia</i> spp.
Ornamental grasses	Graminées ornementales	Siergrassen	
Cacti and succulent plants	Cactées et plantes grasses	Cactussen en succulenten	
Annual ornamentals	Plantes ornementales Annuelles	Sierplanten (eenjarige)	e.g. <i>Chrysanthellum</i> , <i>Petunia</i> , <i>Salvia</i> , <i>Viola</i> , <i>Phalaneopsis</i> , <i>Poinsettia</i>
Chrysanthemum	Chrysanthèmes	Chrysanten	<i>Chrysanthellum</i> spp.

### 3. Data requirements biological dossier

It is proposed to grant authorisations for large groups of ornamental plants based on a limited set of representative tests. Four subgroups have been identified in which efficacy and selectivity must be tested in order to obtain an authorisation in 'ornamentals':

- Conifers (ornamentals)
- Ornamental broadleaf trees and shrubs
- Ornamentals (not woody, perennial)
- Annual ornamentals

The number of species which should be tested for efficacy and selectivity in order to grant an authorisation have been indicated in the tables in the sections below. In general, selectivity should be tested in 1 species/subgroup.

In addition, the relevant information which is available in the main dossier (e.g. efficacy testing) can be used to support the new authorisation. This information will be evaluated on a case by case basis.

Efficacy testing should be made on 'sensitive' species of the concerned subgroup.

If necessary, tests can be done for specific crops such as Azalea, tuberous Begonia, Buxus, Chrysanthemum, *Rosa*, cacti, ornamental grasses and *Erica* and *Calluna*. Specific authorisations can be granted in these crops.

The efficacy of the plant protection product must be tested in accordance with the guidelines of the [European and Mediterranean Plant Protection Organisation](#) (EPPO). This guidance document indicates the requirements for the efficacy and selectivity part of the dossier, which should be taken into consideration when generating the biological dossier.

The crops which have been tested and evaluated in the authorisations procedure are mentioned on the authorisation deed and on the product label. For example: 'The use in ornamental plants was granted based on trials carried out on the following species: *Azalea* and *Tilia*'.

In the sections below, the required number of efficacy and selectivity tests for different crop-enemy combinations are shown for the different type of products (e.g. fungicides, insecticides, herbicides). Due to the high diversity of ornamental crop species, the lists of weeds, pests and diseases are not exhaustive. Reference is made to the EPPO Global Database ([gd.eppo.int](http://gd.eppo.int)) for an updated database of weeds, pests and diseases.



### 3.1. Biological dossier of fungicides

The required number of efficacy and selectivity tests for different crop-disease combinations for fungicides are shown in Table 2. For efficacy, at least one species per entry group has to be tested to grant the authorisation. For example, an efficacy test on 1 *Alternaria* or 1 *Cladosporium* species would be sufficient to grant the authorisation on respectively *Alternaria* or *Cladosporium* in ornamentals. The selectivity has to be tested on a sufficient numbers of crop species (in general 1 species/subgroup).

Table 2: Required number of efficacy and selectivity tests for different crop-disease combinations for fungicides.

Possible crop-disease combinations					Efficacy testing	Selectivity testing
Disease name				Crop name		
Latin	English	Dutch	French			
<i>Albugo candida</i>	rust white	witte roest	rouille blanche	ornamentals (not woody, perennial)	1 perennial species	1 perennial species
<i>Alternaria</i>	leaf blight	alternaria	alternaria	ornamentals	1 species	1 species/subgroup
<i>Armillaria</i>	honey fungus	honingzwam	armillaire	ornamental trees and shrubs	1 species	1 species
<i>Ascochyta</i>	ascochyta (ornamentals)	ascochyta	ascochyta	ornamentals	1 species	1 species/subgroup
<i>Blumeriella jaapii</i>	anthracnose (cherry)	bladvlekkenziekte/ bladvalziekte	cylindrosporiose/ anthracnose	ornamental broadleaf trees and shrubs	1 <i>Prunus</i>	1 <i>Prunus</i>
<i>Botrytis cinerea</i>	grey mould	grauwe schimmel	pourriture grise	ornamentals	1 species	1 species/subgroup
<i>Cercospora</i>	cercospora leaf spot	bladvlekkenziekte	tache cercosporéenne	ornamentals	1 <i>Tilia</i> , <i>Lonicera</i> or <i>Ericaceae</i>	1 <i>Ericaceae</i> , <i>Lonicera</i> or <i>Ericaceae</i>
<i>Chondrostereum purpureum</i>	silver blight (stone fruit)	loodglansziekte	plomb des arbres fruitiers	ornamental broadleaf trees	1 species	1 species

				and shrubs		
<i>Cladosporium</i>	cladosporium	cladosporium ( <i>Cladosporium</i> spp.)	cladosporium ( <i>Cladosporium</i> spp.)	ornamentals	1 species	1 species/subgroup
<i>Colletotrichum</i> ( <i>Glomerella</i> )	anthracnose	anthracnose	anthracnose	ornamentals	1 species	1 species/subgroup
<i>Coniothyrium</i>	brand canker, common canker	stamkanker	chancre du rosier	ornamentals	1 <i>Rosa</i>	2 <i>Rosa</i> (shrub and 'cut flower')
<i>Corioli</i> <i>versicolor</i>	wood decay (raspberry, ornamentals)	zacht witrot	carie de la tige	ornamental broadleaf trees and shrubs	1 species	1 species
<i>Calonectria</i> spp.	Calonectria ( <i>Cylindrocladium</i> )	Calonectria ( <i>Cylindrocladium</i> )	Calonectria ( <i>Cylindrocladium</i> )	ornamentals	1 species	1 species/subgroup
<i>Cylindrosporium</i>	cylindrosporium (ornamentals)	bladvlekkenziekte	cylindrosporiose	ornamentals	1 species	1 species/subgroup
<i>Dothichiza</i> <i>populea</i>	poplar canker	populierenschors- brand	chancre à dothichiza du peuplier	ornamental broadleaf trees and shrubs	1 <i>Populus</i>	1 <i>Populus</i>
<i>Didymascella</i> <i>thujina</i>	needle blight	naaldverbruining	brunissure cryptogamique	conifers (ornamentals)	1 <i>Thuja plicata</i> ' <i>Arovirens</i> '	1 <i>Thuja plicata</i>
<i>Diplocarpon rosae</i>	black spot (rose)	sterroetdauw/ zwartevlekkenziekte	maladie des taches noires du rosier	ornamental broadleaf trees and shrubs	1 <i>Rosa</i>	2 <i>Rosa</i> (shrub and 'cut flower')
<i>Erysiphaceae</i>	powdery mildew	echte meeldauw	oïdium	ornamentals	2 crop species (2 different <i>Erysiphales</i> spp.) <sup>2</sup>	1 species/subgroup
<i>Exobasidium</i> <i>vaccinii</i> var. <i>japonicum</i>	leaf gall (Azalea)	oortjesziekte (azalea)	fausse cloque de l'azalée	ornamental broadleaf trees and shrubs	1 <i>Azalea</i>	1 <i>Ericaceae</i>
<i>Fusarium</i> spp.	fusarium	fusarium	fusariose	ornamentals	1 species	1 species/subgroup

<sup>2</sup> Erysiphales. An extended table of *Erysiphales* species on various crops is provided as Annex 1.

<i>Gloesporium</i> ( <i>Gnomonia</i> )	anthracnose	vruchtrot	anthracnose	ornamental broadleaf trees and shrubs	1 species ( <i>Platanus</i> or <i>Tilia</i> )	1 species/subgroup
<i>Guignardia aesculi</i>	guignardia blotch, guignardia leaf spot	bladvlekkenziekte ( <i>Guignardia</i> ) op paardenkastanje	maladie des taches rouges du marronnier	ornamental trees and shrubs	1 <i>Aesculus</i>	1 <i>Aesculus</i>
<i>Helminthosporium</i>	helminthosporium leaf blight, leaf spots	bladvlekkenziekte	maladie des taches	ornamentals	1 species (pot plant)	1 species/subgroup
<i>Kabatina juniperi</i>	needle blight	taksterfte	brûlure des aiguilles	conifers (ornamentals)	1 species (coniferous)	1 species (coniferous)
<i>Lophodermium seditiosum</i>	pine needle cast disease	dennenschotziekte	rouge cryptogamique du pin	conifers (ornamentals)	1 <i>Pinus</i>	1 <i>Pinus</i>
<i>Marsonnina</i> spp. <sup>3</sup>	leaf spot	bladvlekkenziekte ( <i>Marsonnina</i> ) op populier en wilg	brunissure des feuilles du peuplier - anthracnose du saule	ornamental broadleaf trees and shrubs	1 species (1 <i>Populus</i> or 1 <i>Salix</i> )	1 species (1 <i>Populus</i> or 1 <i>Salix</i> )
<i>Melampsora</i> spp.	rust (poplar)	populierenroest	rouille du peuplier	ornamental broadleaf trees and shrubs	1 <i>Populus</i>	1 <i>Populus</i>
<i>Monilia fructigena</i> / <i>M. laxa</i>	blossom blight (flowers and stems)	tak- en bloesemsterfte ( <i>Monilinia</i> )	moniliose (bouquets floraux et rameaux)	ornamental broadleaf trees and shrubs	1 <i>Prunus</i>	1 <i>Prunus</i>
<i>Mycosphaerella</i> spp.	<i>Mycosphaerella</i> leaf spot	<i>Mycosphaerella</i> bladvlekkenziekte	<i>Mycosphaerella</i>	ornamentals	1 species	1 species/subgroup
<i>Nectria cinnabarina</i> <sup>4</sup>	coral spot (currant, ornamentals)	rode puistjesziekte	maladie du corail	ornamental trees and shrubs	1 species	1 species

<sup>3</sup> *Marsonnina brunnea* on *Populus* and *Marsonnina salicicola* on *Salix*.

<sup>4</sup> *Nectria cinnabarina* on *Populus*, *Tilia*, *Aesculus*, *Pinus*,...

<i>Nectria galligena</i> <sup>5</sup>	eye rot, European canker (apple, pear)	kanker, neusrot	chancre, pourriture de l'oeil	ornamental trees and shrubs	1 species	1 species
<i>Neonectria</i>	nectria canker	nectriakanker	chancre à nectria	ornamental trees and shrubs	1 species	1 species
<i>Ophiostoma novo-ulmi</i>	Dutch elm disease	iepenziekte	graphiose de l'orme	ornamental broadleaf trees and shrubs	1 <i>Ulmus</i>	1 <i>Ulmus</i>
<i>Ovulinia azaleae</i>	petal blight, flower blight	ovulinia (azalea)	ovulinia de l'azalée	ornamental broadleaf trees and shrubs	1 <i>Azalea</i>	1 <i>Azalea</i>
<i>Pestalotia (Pestalotiopsis)</i>	pestalotia brown blight	<i>Pestalotia</i>	<i>Pestalotia</i>	ornamentals	1 species	1 species/subgroup
<i>Phialophora</i>	shallow cup bearer	<i>Phialophora</i>	<i>Phialophora</i>	ornamentals	1 sensitive species (pot plant)	1 sensitive species (pot plant)
<i>Phaeoacremonium aleophilum</i> (syn. <i>Togninia minima</i> ) & <i>Phaemoniella chlamydospora</i>	black Measles/esca of grapevine	esca-ziekte	esca de la vigne	ornamental broadleaf trees and shrubs	1 <i>Vitis</i>	1 species
<i>Phoma</i>	phoma	phoma	phoma	ornamentals	1 species	1 species/subgroup
<i>Phytophthora cinnamomi</i> <sup>6</sup>	root and crown rot	wortelphytophthora	phytophthora des racines	ornamentals	1 root-sensitive species	1 species/subgroup
<i>Phytophthora</i> spp. / <i>Peronospora</i> spp. <sup>7</sup>	leaf and stem phytophthora in ornamentals	blad-en takphytophthora en valse meeldauw	mildiou des plantes ornementales	ornamentals	1 species for <i>Phytophthora</i> and/or 1 species for	1 species/subgroup

<sup>5</sup> *Nectria galligena* on *Fagus*, *Betula*, *Ulmus*, *Sorbus*, ...

<sup>6</sup> The main *Phytophthora* on root organs are *P. cinnamoni* and *P. cryptogea*. They can also cause foot rot.

<sup>7</sup> The main *Phytophthora* on root organs are *P. cinnamoni* and *P. cryptogea*. They can also cause foot rot. *Phytophthora*, *Peronospora* spp. The main *Phytophthora* on leaves and stem organs are *P. cactorum*, *P. citricola*, *P. ramorum*. The downy mildew species in ornamentals are *Peronospora*. Other genera are less important (*Bremia*, *Plasmopara*, *Basidiophora*).

					<i>Peronospora</i>	
<i>Phytophthora ramorum</i>	<i>Phytophthora ramorum</i>	<i>Phytophthora ramorum</i>	<i>Phytophthora ramorum</i>	ornamental broadleaf trees and shrubs	1 species	1 species
<i>Pleiochaeta</i>	Pleiochaeta leaf spot	bladvlekkenziekte	maladie des taches brunes	ornamental broadleaf trees and shrubs	1 <i>Cytisus</i>	1 sensitive species
<i>Seifertia azaleae</i>	bud blight of Rhododendron	knopverbruining	soufle de bourgeon de rhododendron	ornamental broadleaf trees and shrubs	1 <i>Rhododendron</i>	1 <i>Rhododendron</i>
<i>Pythium</i>	Pythium wilt	kiemschimmels	fontes de semis	ornamentals	1 species	1 species/subgroup
<i>Ramularia</i>	leaf spot	Ramularia-bladvlekkenziekte	Ramulariose	ornamentals	1 species	1 species/subgroup
<i>Rhizoctonia solani</i>	black scurf	zwartrot (rhizoctonia)	rhizoctone	ornamentals	1 species (preferably on young seedlings or cuttings)	1 species/subgroup
<i>Rhytisma</i>	tar spot disease	inktvlekkenziekte ( <i>Acer</i> )	maladie des taches noires de l'érable	ornamental broadleaf trees and shrubs	1 <i>Acer</i>	1 <i>Acer</i>
<i>Puccinia, Uromyces, Phragmidium,...</i>	rust	roest	rouilles	ornamentals	1 <i>Dendranthemum</i> + 1 broadleaf tree/shrub ( <i>Salix, Populus</i> or <i>Hypericum</i> )	1 species/subgroup
<i>Puccinia horiana</i>	Japanese rust ( <i>Chrysanthemum</i> )	Japane roest	rouille japonaise	ornamental annual plants	1 chrysant	1 chrysant
<i>Sclerotinia</i> spp.	sclerotinia	sclerotiënrot	sclérotiniose	ornamentals	1 species	1 species/subgroup
<i>Septoria</i>	leaf spot	septoria	septoriose	ornamentals	1 species	1 species/subgroup

<i>Sphaerotheca pannosa</i>	powdery mildew (rose)	echte meeldauw	oïdium du rosier	ornamental broadleaf trees and shrubs	1 rose	1 rose
<i>Stemphylium</i>	purple spot	Stemphylium	Stemphylium	ornamentals	1 species	1 species/subgroup
<i>Stigmina carpophila</i> ( <i>Coryneum beijerinckii</i> )	shoot blight (cherry, plum)	hagelschotziekte	maladie criblée	ornamental broadleaf trees and shrubs	1 <i>Prunus</i>	1 <i>Prunus</i>
<i>Taphrina deformans</i>	leaf curl (peach)	krulziekte	cloque du pêcher	ornamental broadleaf trees and shrubs	1 species	1 species
<i>Thielaviopsis</i> sp., <i>Cylindrocarpon</i> sp.	root parasites (ornamentals)	wortelziekten	maladies des racines	ornamentals	1 species	1 species/subgroup
<i>Venturia</i> spp., <i>Spilocaea</i> spp. <sup>8</sup>	scab	schurft	tavelure	ornamental broadleaf trees and shrubs	1 species	1 species
<i>Verticillium</i> sp.	Verticillium	verwelkingsziekte	verticilliose	ornamentals	1 species	1 species/subgroup
<i>Volutella buxi</i>	decay of branches	taksterfte	dépérissement des rameaux du buis	ornamental broadleaf trees and shrubs	1 <i>Buxus</i>	1 <i>Buxus</i>

<sup>8</sup> The most common species on ornamental trees and shrubs are:

- *Venturia inaequalis* on *Malus* (sierappel/pommier ornamental) and occasionally on *Sorbus* (lijsterbes/sorbier) and *Crataegus* (meidoorn/aubépine)
- *Venturia pirina* on *Pyrus* (sierpeer/poirier ornamental)
- *Venturia saliciperda* on *Salix* (wilg/saule)
- *Spilocaea pyracanthae* on *Pyracantha* (vuurdoorn/*Pyracantha*)

## 3.2. Biological dossier of acaricides

The required number of efficacy and selectivity tests for different crop-pest combinations for acaricides are shown in Table 3. For efficacy, at least one species per entry group has to be tested to grant the authorisation. For example, an efficacy test on 1 tarsonemid species would be sufficient to grant the authorisation on *Tarsonemidae* in ornamentals. The selectivity has to be tested on a sufficient number of crop species (in general 1 species/subgroup).

Table 3: Required number of efficacy and selectivity tests for different crop-pest combinations for acaricides.

Possible crop-pest combinations					Efficacy testing	Selectivity testing
Pest name				Crop name		
Latin	English	Dutch	French			
<i>Mites</i>						
<i>Tetranychidae</i>	spider mites	spintmijten	acariens tétranyques	ornamentals	1 mite species	1 plant species/subgroup
<i>Tarsonemidae</i>	tarsonemid mites	weekhuidmijten	tarsonèmes	ornamentals	1 mite species	1 plant species/subgroup
<i>Eriophyidae</i>	bud mite (ornamentals)	galmijten en roestmijten	phytoptes	ornamentals	1 mite species	1 plant species/subgroup

### 3.3. Biological dossier of insecticides

The required number of efficacy and selectivity tests for different crop-pest combinations for insecticides are shown in Table 4. For efficacy, at least one species per entry group has to be tested to grant the authorisation. For example, an efficacy test on 1 weevil or 1 wireworm species would be sufficient to grant the authorisation on respectively *Anthonomus* or *Agriotes* in ornamentals. The selectivity has to be tested on a sufficient numbers of crop species (in general 1 species/subgroup).

Table 4: Required number of efficacy and selectivity tests for different crop-pest combinations for insecticides.

Possible crop-pest combinations					Efficacy testing	Selectivity testing
Pest name				Crop name		
Latin	English	Dutch	French			
<i>Coleoptera</i>						
<i>Anthonomus</i>	weevils	bloesemkevers	anthonomes	ornamentals	1 insect species	1 plant species/subgroup
<i>Polydrusus</i> spp., <i>Phyllobius</i> spp. <sup>9</sup>	leaf weevils	bladrandsnuitkever	charançon des feuilles	ornamentals	1 insect species (adult and/or larvae)	1 plant species/subgroup
<i>Agriotes</i>	wireworms	ritnaalden (kniptor)	taupins	ornamentals	1 insect species	1 plant species/subgroup
<i>Buprestidae</i> <sup>10</sup>	jewel beetles	prachtkevers	buprestes	ornamental broadleaf trees and shrubs	1 insect species	1 plant species/subgroup
<i>Chrysomelidae</i> <sup>11</sup>	chrysomelid beetles	haantjes	chrysomèles	ornamentals	1 insect species	1 plant species/subgroup

<sup>9</sup> *Curculionidae* (*Polydrusus* spp., *Phyllonius* spp. and *Otiorrhynchus* spp.). The most common species are *Othiorrhynchus sulcatus*, *O. ovatus*, *Phyllobius calcaratus* and *Polydrusus sericeus*. The damages are mainly caused by the larvae. The life cycles of those species are similar and consequently the insecticide treatments. Other *Curculionidae*, like *Anthonomus* and *Hylobius abietis* have a different life cycle.

<sup>10</sup> The most common species is *Agrilus sinuatus* (agrile du Poirier/perenringworm, perenprachtkever) on ornamental fruit trees, *Crataegus* and *Sorbus*.

<sup>11</sup> The most common species are:

- *Crioceris lili* (criocère du lis/leliehaantje)
- *Chrysomela* spp. (broadleaf trees and shrubs)
- *Phyllodecta* spp. (e.g. *Phyllodecta vitellinae*) (chrysomèle cuivrée dessauls/wilgenhaantje)



<i>Hylobius abietis</i>	large brown pine weevil	grote dennensnuitkever	hylobe du pin	conifers (ornamentals)	1 insect species	1 plant species/subgroup
<i>Melolontha</i> <sup>12</sup>	cockchafer	engerlingen	vers blancs	ornamentals	1 insect species	1 plant species/subgroup
<i>Otiorrhynchus</i> <sup>13</sup>	broad-nosed weevils	lapsnuitkevers	otiorhynques	ornamentals	1 insect species	1 plant species/subgroup
<i>Scolytus</i>	fir engraver beetles	spintkever/bastkever	scolytes	ornamental trees and shrubs	1 insect species	1 plant species/subgroup
<i>Halticini</i>	flea beetles	aardvlooien	altises	ornamentals	1 insect species	1 plant species/subgroup
<b>Diptera</b>						
<i>Agromyzidae</i>	miner flies	mineervliegen	mouches mineuses	ornamentals	1 insect species	1 plant species/subgroup
<i>Cecidomyiidae</i>	midges	galmuggen	cécidomyies	ornamentals	1 insect species	1 plant species/subgroup
<i>Sciaridae</i> <sup>14</sup>	dark-winged fungus gnats	rouwmuggen	mouches du terreau	ornamentals	1 insect species	1 plant species/subgroup
<i>Tipula</i>	leatherjackets	emelten (langpootmuggen)	tipules	ornamentals	1 insect species	1 plant species/subgroup
<b>Heteroptera</b>						
<i>Miridae</i>	plant bugs	wantsen	punaises	ornamentals	1 insect species	1 plant species/subgroup

- *Agelastica alni* (galéruque del'aulne/elzenhaantje)

<sup>12</sup> *Scarabaeidae* (*Melolontha vulgaris*, *Hoplia philantus*). The most common species of the family *Scarabaeidae* present in ornamentals are:

- *Melolontha melolontha* (hanneton commun/meikever) (present in all types of ornamentals)
- *Hoplia philanthus* (hoplia floricole/sallandkever) (mainly present in lawn; this species becomes more and more present in lawn)
- *Phyllopertha horticola* (hanneton horticole/rozenkever) (mainly present in lawn). The damages are caused by the larvae.

<sup>13</sup> *Curculionidae* (*Polydrusus* spp., *Phyllonius* spp. and *Otiorrhynchus* spp.) (Charançons/Snuitkevers). The most common species are *Otiorrhynchus sulcatus*, *O. ovatus*, *Phyllobius calcaratus* and *Polydrusus sericeus*. The damages are mainly caused by the larvae. The life cycles of those species are similar and consequently the insecticide treatments. Other *Curculionidae*, like *Anthonomus* and *Hylobius abietis* have a different life cycle.

<sup>14</sup> The taxonomic identification of these small flies (*Diptera*) is complex. The most important pest species are *Bradysia*, *Lycoriella* en *Sciara*. The most common species is *Sciara* (varenrouwmug/mouche sciaride ou mouche des terreaux), larvae in substrate of crops under protection (mainly cuttings).

<i>Pentatomidae</i>	shield bugs	schildwantsen	pentatomidés	ornamentals	1 insect species	1 plant species/subgroup
<b>Homoptera</b>						
<i>Aphididae</i> <sup>15</sup> <i>Lachnidae</i> <i>Callaphididae</i>	aphids	bladluizen	pucerons	ornamentals	1 'easy' and 1 'difficult' species	1 plant species/subgroup
<i>Cicadellid</i>	leafhoppers	cicaden	cicadelles	ornamentals	1 insect species	1 plant species/subgroup

<sup>15</sup> The main leaf aphids and stem aphids are found in 3 families: *Aphididae*, *Lachnidae*, *Callaphididae*. 1 'easy' + 1 'difficult' species should be tested for the entry group aphids. The species which are 'difficult' to control are indicated by an asterisk.

The most important species of the *Aphididae* are found herebelow.

- *Aphis fabae* (zwarte bonenluis/puceron noir de la fève). This species is polyphageous (outdoor and under protection)
- *Aphis gossypii* \* (katoenluis/puceron du melon et du coton). This species is polyphageous (outdoor and under protection)
- *Aphis* spp. Aphids which are found on numerous plant species. The most common species is *Aphis pomi* (groene appeltakluis/puceron vert du pommier et du poirier)
- *Elatobium abietinum* (groene sparrennaaldluis/puceron vert de l'épicea de Sitka) on *Picea*
- *Myzus cerasi* (zwarte kersenluis/puceron noir du cerisier) on *Prunus*
- *Myzus persicae* (groene perzikluis/puceron vert du pêcher). This species is polyphageous (outdoor and under protection).
- *Rhodobium porosum*\* (gele rozenluis of tabaksperzikluis/puceron jaune du rosier). This species is polyphageous, mainly under protection.
- *Macrosiphum euphorbiae* (aardappeltopluis/puceron de la pomme de terre). This species is polyphageous, mainly under protection.
- *Aulacorthum solani* (boterbloemluis/puceron des serres et des pommes de terre). This species is polyphageous, mainly under protection, but also outdoor
- *Aulacorthum circumflexum* (gevlekte bladluis/puceron des serres). This species is polyphageous, outdoor and under protection.

The most important species of the *Lachnidae* (takluizen/pucerons des rameaux) are found herebelow.

- *Cinara* spp.: Stem aphid on coniferous trees
- *TuberoLachnus salignus* (dromedarisluis/gros puceron du saule)
- *Lachnus* spp. (takluizen/puceron des rameaux)

The most important species of the *Callaphididae* are found herebelow.

- *Myzocallis* spp.: many species are monophageous e.g. on *Corylus*, *Quercus* and *Castanea*. The most common species is *Myzus coryli* (hazelnootbladluis/puceron jaune du noisetier)
- *Takecallis arundicolens* (bamboebladluis/puceron des bambous). This species is monophageous.
- *Eucallipterus tillae* (lindenbladluis/puceron du tilleuil). This species is monophageous.
- *Phyllaphis fagi*\* (beukenbladluis/Puceron des feuilles du hêtre). This species is monophageous.
- *Euceraphis betulae* (berkenbladluis/puceron cendré du bouleau). This species is monophageous.

ae						
<i>Adelgidae</i> <sup>16</sup>	gall aphids (conifers)	galluizen (chermes-, sparappel-, dennewolluis)	chermès galligènes des conifères	conifers (ornamentals)	1 <i>Adelges</i> spp. or 1 <i>Pineus</i> spp.	1 plant species/subgroup
<i>Eriosoma</i> <sup>17</sup>	wooly aphids	bloedluizen	pucerons lanigères	ornamental broadleaf trees and shrubs	1 insect species ( <i>Eriosoma lanigerum</i> )	1 plant species/subgroup
<i>Pemphigus</i> spp. <sup>18</sup>	root aphid	wollige wortelluis	puceron des racines	ornamentals	1 insect species	1 plant species/subgroup
<i>Psyllidae</i> , <i>Triozidae</i> , <i>Carsidaridae</i> , <i>Spondyliaspidae</i> <sup>19</sup>	psyllids	bladvlooiën	psylles	ornamental broadleaf trees and shrubs	1 insect species	1 plant species/subgroup

<sup>16</sup> The most common species are :

- *Adelges* (= *Sachiphantes*) *abietis* (*sparrengalluis*/chermès de l'épicea) on *Picea abies*
  - *Adelges* (= *Gilletella*) *cooleyi*. Depending on the plant where the insect is found : on *Picea sitchensis* (*douglaswolluis*/chermès des galles de l'épicea de Sitka); on *Pseudotsuga menziesii* (*douglaswolluis*/ chermès du sapin de Douglas)
  - *Adelges laricis* (syn. *A. coccineus*) : *Adelges viridis*. Depending on the plant where the insect is found : on *Larix* (*larixwolluis*/chermès des aiguilles de mélèze); on *Picea abies* and *P. sitchensis* (*ananasgalluis*/ chermès de la galle ananas de l'épicea)
  - *Pineus pini* (*wollige dennenluis*/chermès du pin sylvestre) present on 2-needle *Pinus*, mainly *Pinus sylvestris*
  - *Pineus strobi* (= *strobilus*) (*wollige dennenluis*/adelges du pin Weymouth) present on 2-needle *Pinus*, mainly *Pinus strobus* (Pin. Weymouth)
- The taxonomy of the *Adelgidae* and the host-relationship of coniferous trees and gall aphids species is very complex. It is proposed that efficacy testing should be done on one *Adelges* species or one *Pineus* species.

<sup>17</sup> *Eriosoma lanigerum* (Puceron lanigère/Appelbloedluis). The insect is present on *Chaenomeles japonica*, *Cotoneaster*, *Malus*, *Crataegus*, *Pyracantha*, *Sorbus*,...

<sup>18</sup> *Pemphigidae* (e.g. *E. lanigerum*) and *Rhizococcus* spp. The most common species are :

- *Eriosoma ulmi* (*bessenwortelluis*/Puceron des racines du groseillier)
- *Stagona pini* (*dennenwortelluis*/Puceron des racines du pin)
- *Rhizococcus falcifer* (*wollige wortelluis*/Cochenille farineuse des racines). This species is present on ferns and palms grown under protection.
- *Rhizococcus cacticans* (*wollige wortelluis*/Cochenille farineuse des racines). This species is present on *Cactaceae*, *Bromeliaceae* and succulent plants grown under protection.

<sup>19</sup> *Psyllidae*, *Triozidae*, *Carsidaridae*, *Spondyliaspidae*. The most common species are :

- *Psyllidae*: *Psyllopsis fraxinii* (*fraxinusbladvlo*/psylle galligène du frêne); *Psylla pyri* (*Perenbladvlo*/ galligène du poirier); *Psylla buxi* (*buxusbladvlo*/Psylle du buis) and *Cacopsylla fulguralis* (*bladvlo op Eleagnus*/psylle sur *Eleagnus*)
- *Triozidae*: *Triozia alacris* (*laurierbladvlo*/Psylle du laurier sauce)

<i>Trialeurodes vaporariorum</i> , <i>Bemisia tabaci</i> <sup>20</sup>	white fly	witte vliegen	mouches blanches / aleurodes	ornamentals	1 insect species	1 plant species/subgroup
<i>Coccoidae</i> <sup>21</sup> <i>Diaspidae</i> <sup>22</sup> , <i>Coccidae</i> <sup>23</sup> <i>Eriococcidae</i> <sup>24</sup> ,	scale insects	dop-, schild- en wolluizen	cochenilles	ornamentals	1 insect species	1 plant species/subgroup

- *Carsidaridae* and *Spondylaspidae*: not present under practical conditions

<sup>20</sup>*Aleyrodidae*. The most common species are *Trialeurodes vaporariorum* (kaswittevlieg/aleurode des serres) and *Bemisia tabaci* (tabakswittevlieg/Mouche blanche du tabac). Both species are polyphagous. They are mainly found in protected crops.

<sup>21</sup>*Coccidae*, *Diaspidae*, *Eriococcidae*, *Pseudococcidae*. In some taxonomic systems the family *Coccidae* is subdivided in sub-families *Diaspinae*, *Lecaninae* and *Coccinae*. In other taxonomic systems the *Diaspidae* (schildluizen/diaspines - cochenilles à bouclier), *Coccidae* (dopluizen/cochenilles à carapace), *Eriococcidae* and *Pseudococcidae* (wolluizen/cochenilles farineuses) are considered as families. This last opinion was chosen herebelow. *Rhizoecus* spp. is considered under the root aphids (wortelluizen/pucerons des racines).

<sup>22</sup>*Diaspidae* (schildluizen/diaspines - cochenilles à bouclier). The most common species are :

- *Aspidiotus nerii* (cochenille du laurier-rose). This species is mainly found on crops grown under protection, e.g. *Nerium oleander*, *Dracaena* and palms.
- *Aspidiotus hederae*. This species is mainly found on crops grown under protection, e.g. *Hedera* and palms
- *Carulaspis juniperi* (= *C. visci*) (jebeverbesschildluis/cochenille à bouclier du genévrier). This species is found on a few conifer species.
- *Pinnaspis aspidistrae* (varenschildluis/cochenille à bouclier des fougères) on crops under protection, e.g. ferns and palms
- *Unaspis euonymi* (schildluis op *Euonymus*/cochenille du fusain)
- *Lepidosaphis ulmi* (kommaschildluis/cochenille virgule du pommier). This species is mainly found on on outdoor crops e.g. *Malus*, *Buxus*, *Ceanothus*, *Cotoneaster*,...

<sup>23</sup>*Coccidae* (dopluizen/cochenilles à carapace). The most common species are :

- *Chloropulvinaria floccifera* (pulvinale dopluis/Pulvinaire du Houx). This species is mainly found on outdoor crops e.g. *Camellia*, *Taxus*, *Ilex*
- *Pulvinaria regalis* (Pulvinaire dopluis/Pulvinaire du Marronnier d'Inde). This species is mainly found on outdoor crops e.g. *Acer*, *Aesculus hippocastanum*, *Cornus*, *Tilia*, *Magnolia*, *Skimmia*, *Ulmus*,...
- *Eupulvinaria hydrangeae* (Pulvinaire dopluis op *Hydrangea*/Cochenille pulvinaire de l'Hortensia). This species is mainly found on outdoor crops e.g. *Acer*, *Hydrangea*, *Tilia*, *Cornus*, *Viburnum*
- *Coccus hesperidum* (platte dopluis/Pou des Hespérides). This species is found on outdoor crops and on crops under protection, e.g. *Ficus*, *Camellia*, *Citrus*, *Hedera*, *Laurus nobilis*
- *Parthenolecanium pomericum* (dopluis op *Taxus*/Cochenille à carapace de l'If). This species is monophagous on *Taxus baccata*.
- *Saissetia coffeae* (halvebol dopluis/Cochenille tortue des serres). This species is present on crops under protection, e.g. *Asparagus*, *Dianthus*, *Ficus*, *Orchids*,...

<sup>24</sup>*Eriococcidae*. No important species in this family (*Cryptococcus fagi* and *Gossyparia ulmi*).

<i>Pseudococcidae</i> <sup>25</sup>						
<b>Hymenoptera</b>						
<i>Formicidae</i>	ants	mieren	fourmis	ornamentals	1 mite species	1 plant species/subgroup
<i>Tenthredinidae</i> <sup>26</sup>	sawfly	zaagwespen, bastaardrupsen	hoplocampes, tenthredes	ornamental trees and shrubs	1 insect species	1 plant species/subgroup
<b>Lepidoptera</b>						
<i>Lymantriidae, Lasiocampidae</i> <sup>27</sup>	tussock moths, lappet moths	donsvlinders (borstelrupsen, spinners)	<i>Lymantriides, Lasiocampiides</i>	ornamental trees and shrubs	1 insect species	1 plant species/subgroup
<i>Mamestra,</i>	cutworms	bladvretende	chenilles	ornamentals	1 insect species	1 plant species/subgroup

<sup>25</sup> *Pseudococcidae* (Cochenilles farineuses) : *Planococcus citri* (wolluis/Cochenille farineuse de l'orange). This species is polyphagous and present on crops under protection.

<sup>26</sup> *Tenthredinidae*, *Argidae* (Hoplocampes, tenthredes/Bladwespen, bastaardrupsen). Both *Hymenoptera* families have the same type of larvae (caterpillar-like). The most common species are:

- *Tenthredinidae*:
- *Caliora spp.* (bastaardslakkenrupsen/tenthredè-limaces des feuilles). Mainly found on *Tilia*, *Quercus*, *Rosaceae*
- *Croesus septentrionalis* (Elzenbladwesp/Tenthredè du noisetier), mainly on *Corylus*
- *Scolioneura betuleti*. This species is monophagous on *Betula*
- *Diprion pini* (= *Lophyrus pini*) (dennenbladwesp/Lophyre du pin). This species is monophagous on *Pinus*.
- *Argidae*: *Arge spp.* (bladwespen/Tenthredes). Mainly on *Rosa*, *Berberis*, *Betula* and *Salix*

<sup>27</sup> The most common species are:

- *Lasiocampidae*:
  - *Malocosoma neustria* (ringelrupsvlinder/Bombyx à livrée) on several tree and shrub species
  - *Poecilocampa populi* (Bombyx du peuplier) (less common)
  - *Eriogaster lanestris* (Bombyx laineux/woldrager) (less common)
- *Lymantriidae*:
  - *Orgyia antiqua* (witvlakvlinder/Orgyie antique) on several tree and shrub species
  - *Euproctis chrysorrhoea* (Bastaardsatijnvlinder/Bombyx cul-brun) on several tree and shrub species
  - *Euproctis similis* (donsvlinder/Bombyx cul-doré) on several tree and shrub species
  - *Lymantria monacha* (nonvlinder/nonne) on several tree and shrub species
  - *Leucosoma salicis* (Bombyx du saule/satijnvlinder) (less common)
  - *Lymantria dispar* (= *Porthetria dispar*) (Bombyx disparate (Spongieuse)/plakker) (less common)

<i>Spodoptera, Autographa, Orthosia, Thaumetopoeidae, Pieris, ...</i>		rupsen	défoliatrices			
<i>Agrotis, Noctua, Euxoa</i>	noctuid caterpillars	aardrupsen	chenilles terricoles	ornamentals	1 insect species	1 plant species/subgroup
<i>Cacoecia, Spilonata, Argyroploce, Pandemis, Notocelia</i> <sup>28</sup>	leafrollers, tortrix moths	bladrollers	tordeuses du feuillage	ornamentals	1 insect species	1 plant species/subgroup
<i>Geometridae (Cheimatobia, Hibernia)</i> <sup>29</sup>	wintermoths	wintervlinders	chéimatobie brumeuse, phalène défeuillante	ornamentals	1 insect species	1 plant species/subgroup
<i>Yponomeutidae</i> <sup>30</sup>	ermine moths	spinselmotten	hyponomeutes	ornamental trees and shrubs	1 insect species	1 plant species/subgroup

<sup>28</sup> The most common species are :

- *Acleris* spp. (e.g. *Acleris latifasciana* (= *Acalla Schalleriana*) (azaleabladroller)
- *Adoxyphyes orana* (heggebladroller of vruchtbladroller/Tordeuse capua). This species is polyphageous, outdoor and under protection
- *Archips* spp. on broadleaf trees
- *Cacoecimorpha pronubana* (anjerbladroller/tordeuse de l'œillet). This species is- polyphageous, outdoor and under protection
- *Clepsis spectrana* (costana) (koolbladroller/tordeuse à quatre taches du rosier). This species is polyphageous
- *Tortrix* spp. (e.g. *Tortrix viridana* (eikenbladroller/tordeuse verte du chêne)
- *Phyaconia buoliana* (dennenlotrups/tordeuse de la pousse du Pin)

<sup>29</sup> *Cheimatobia, Hibernia* (*Geometridae*). The most common species are:

- *Operophtera brumata* (*Cheimatobia brunata*) (kleine wintervlinder/Phalène hiémale)
- *Erannis defoliaria* (*Hibernia defoliaria*) (grote wintervlinder/phalène défeuillante ou hibernie)
- several other *Geometridae* species.

<sup>30</sup> *Yponomeutidae* (*Hyponomeutes, Stippelmotten*). The most common species are:

- *Argyresthia* spp. (e.g. *Argyresthia trifasciata* (jeneverbesmineermot/teigne des pousses de Thuja)
- *Yponomeuta* spp. (stippelmot/hyponomeute)

<i>Thaumetopoeidae</i> <sup>e31</sup>	oak processionary	processierupsen	chenilles processionnaires	ornamental trees and shrubs	1 insect species	1 plant species/subgroup
<i>Cossidae</i> <sup>32</sup>	cossid millers or carpenter millers	houtvlinders	zeuzère, cossus	ornamental broadleaf trees and shrubs	1 insect species	1 plant species/subgroup
<i>Sesiidae</i>	apple clearwing	glasvlinders	sésies	ornamental broadleaf trees and shrubs	1 insect species	1 plant species
<i>Gracillariidae/De pressariidae</i> <sup>33</sup>	leaf-miner caterpillars	mineermotten	chenilles mineuses/teignes	ornamentals	1 insect species	1 plant species/subgroup
<b>Thysanoptera</b>						
<i>Thysanoptera</i> <sup>34</sup>	thrips	trips	thrips	ornamentals	1 insect species	1 plant species/subgroup

<sup>31</sup> *Thaumetopoeidae* (chenilles processionnaires, Processierupsen). The most common species are:

- *Thaumetopoea pityocampa* (*dennenprocessierups/Processionnaire du pin*)
- *Thaumetopoea processionea* (*eikenprocessierups/Processionnaire du chêne*)

<sup>32</sup> *Cossidae* (Zeuzère, Cossus/Houtvlinders). The most common species are :

- *Zeuzera pyrina* (*gestippelde houtvlinder/zeuzère*) polyphageous on broadleaf trees
- *Cossus cossus* (*wilgenhoutvlinder/cossus gâte*) bois - polyphageous on broadleaf trees

<sup>33</sup> Micro-lepidoptera. The most common species are:

- *Stigmella* spp. (*mineermot/teigne mineuse*) on broadleaf trees and shrubs
- *Caloptilia azaleella* (*Azaleae*) (*azaleamotje/teigne des azalées*)
- *Caloptilia* spp. (*mineermot/teigne*) on broadleaf trees and shrubs
- *Phyllonorycter* spp. (*mineermot/teigne*) on broadleaf trees and shrubs
- *Cameraria ohridella* (*kastanjemineermot/mineuse du marronnier*)
- *Lyoneta clerkella* (*bliksemschichtmineermot/teigne à mine sinueuse*) on broadleaf trees and shrubs
- *Leucoptera scitella* (*Malifoliella*) (*damschijfmineermot/lcémiofistome*) on broadleaf trees and shrubs

<sup>34</sup> The most common species are:

- *Dendrothrips ornatus* (*Ligustertrips/thrips des arbustes d'ornement*), mainly on *Ligustrum* and *Syringa*
- *Frankliniella occidentalis* (*Californische trips/thrips californien*), mainly under protection, but also outdoor
- *Thrips tabaci* (*tabakstrips/thrips du tabac*), outdoor and under protection
- *Heliothrips haemorrhoidalis* (*zwarte kastrips/thrips des serres*)
- *Echinothrips americanus*, under protection

### 3.4. Biological dossier of other pests

The required number of efficacy and selectivity tests for different crop-pest combinations for other pests are shown in Table 4. For efficacy, at least one species per entry group has to be tested to grant the authorisation. For example, an efficacy test on 1 springtail species would be sufficient to grant the authorisation on *Collembola* in ornamentals. The selectivity has to be tested on a sufficient numbers of crop species (in general 1 species/subgroup).

Table 5: Required number of efficacy and selectivity tests for different crop-pest combinations for other pests.

Possible crop-pest combinations					Efficacy testing	Selectivity testing
Pest name				Crop name		
Latin	English	Dutch	French			
<b><i>Collembola</i></b>						
<i>Collembola</i>	springtails	collembolen (springstaarten)	collemboles	ornamentals	1 species	1 plant species/subgroup
<b><i>Myriapoda</i></b>						
<i>Blaniulus, lulus and Scutigera</i>	millipedes, centipedes	miljoen- en duizendpoten	blaniules et scutigérelles	ornamentals	1 species	1 plant species/subgroup

- *Thrips setosus*
- *Thrips parvispinus*
- *Dichromothrips corbeti*
- *Chaetanaphothrips orchidii*
- *Dichromothrips corbetti*



### 3.5. Biological dossier of herbicides

Due to the large variety of crops and cropping systems (protected crops, crops grown outdoor, potted plants, ...) and different irrigating systems, a general procedure of testing cannot be established easily. It is necessary to clearly describe the testing conditions. The efficacy of the tested herbicides is generally well known on the basis of studies on 'major crops'. Selectivity testing is the key point in the evaluation of herbicides.

Some weed species are considered as 'difficult' to control, as indicated in Table 5. However, the authorisations are preferably granted for large groups of weeds, see first column of Table 6 below.

Table 6: Groups of weeds and examples of weeds that are difficult to control within each group.

Weed group			Hard-to-control weeds			
English	Dutch	French	Latin	English	Dutch	French
grasses (annual)	eenjarige grasachtige onkruiden	graminées annuelles	<i>Poa annua</i>	pathgrass, annual meadowgrass	straatgras	pâturin annuel
			<i>Echinochloa crus galli</i>	cockspur grass	hanenpoot	panic pied-de-coq
grasses (perennial)	doorlevende grasachtige onkruiden	graminées vivaces	<i>Agropyron repens</i>	couch-grass	kweekgras	chiendent
			<i>Cyperus esculentus</i>	nutsedge	knolcyperus	souchet comestible
broad-leaved plants (annual)	eenjarige tweezaadlobbige onkruiden	dicotylées annuelles	<i>Viola arvensis</i>	field pansy	akkerviooltje	pensée des champs
			<i>Chenopodium album</i>	white goosefoot	melganzenvoet	chénopode blanc
			<i>Galinsoga parviflora</i>	gallant soldier, quickweed	klein knopkruid	galinsoge à petites fleurs
			<i>Stellaria media</i>	chickweed	vogelmuur	mouron des oiseaux
			<i>Amaranthus</i> spp.	amaranth	amaranten	amaranthes
			<i>Epilobium</i>	willowherb	wilgenroosje, basterdwederik	épilobe

			<i>Urtica</i>	nettle	brandnetels	ortie
			<i>Erigeron canadensis</i>	Canadian fleabane	Canadese fijnstraal	érigéron du Canada
			<i>Matricaria chamomilla</i>	wild chamomile	kamille (echte)	matricaire camomille
			<i>Cardamine</i> spp.	bittercress	springkruiden	cardamines
			<i>Sagina procumbens</i>	procumbent pearlwort	liggende vetmuur	sagine rampante
			<i>Senecio vulgaris</i>	common groundsel	klein kruiskruid	séneçon commun
dicot weeds broad-leaved plants (perennial)	doorlevende tweezaadlobbige onkruiden	dicotylées vivaces	<i>Cirsium / Carduus</i>	thistles	distels	chardons
			<i>Rorippa sylvestris</i>	creeping yellowcress	akkerkers	cresson des champs
			<i>Ranunculus</i>	buttercup	boterbloem	renoncule
			<i>Convolvulus arvensis / Convolvulus sepium</i>	field bindweed/hedge bindweed	akkerwinde/haagwinde	liseron des champs / liseron des haies
			<i>Oxalis</i> spp.	yellow sorrel	klaverzuring	oxalis
			<i>Sonchus arvensis</i>	field sowthistle	akkermelkdistel	laiteron des champs
			<i>Geranium</i> spp.	cranesbill	ooievaarsbek	géranium
			<i>Taraxacum officinale</i>	dandelion	paardenbloem	pissenlit
			<i>Rumex</i>	dock	zuring	oseille
			<i>Salix</i> spp.	willow seedlings	wilgenzaailingen	semis de saule
			<i>Aegopodium podagraria</i>	ground elder	zevenblad	aegopode podagraire
<i>Pteridophyta</i>			<i>Equisetum</i>	horsetail	paardenstaart	prêles
			<i>Marchantia polymorpha</i>	common liverwort	paraplutjesmos	marchantie polymorphe

			<i>Musci</i>	moss	bladmos	mousse
--	--	--	--------------	------	---------	--------

Efficacy and selectivity have to be tested on a sufficient numbers of crop species as indicated in Table 7 below.

Table 7: Required number of efficacy and selectivity tests for different crop-weed combinations for herbicides.

Possible crop-weed combinations			Crop name	Efficacy testing	Selectivity testing
Weed name					
English	Dutch	French			
grasses (annual)	eenjarige grasachtige onkruiden	graminées annuelles	ornamental trees and shrubs	1 broadleaf species and 1 conifer species (if the efficacy on weeds or on a specific weed species is not known)	4 broadleaf crop species, 1 scale-conifer ( <i>Thuja, Chamaecyparis,...</i> ) and 1 needle-conifer ( <i>Picea, Pinus,...</i> )
grasses (perennial)	doorlevende grasachtige onkruiden	graminées vivaces			
broad-leaved plants (annual)	eenjarige tweezaadlobbige onkruiden	dicotylées annuelles	ornamental broadleaf trees and shrubs	1 crop species (if the efficacy on weeds or on a specific weed species is not known)	4 broadleaf crop species
dicot weeds broad-leaved plants (perennial)	doorlevende tweezaadlobbige onkruiden	dicotylées vivaces			
particular weed species			conifers (ornamentals)	1 crop species (if the efficacy on weeds or on a specific weed species is not known)	1 scale-conifer ( <i>Thuja, Chamaecyparis,...</i> ) and 1 needle-conifer ( <i>Picea, Pinus,...</i> )
			ornamentals (not woody)	2 crop species (1 perennial and 1 annual)	2 crop species (1 perennial and 1 annual)

### 3.6. Biological dossier of growth regulators

The required number of efficacy and selectivity tests for different crop-target combinations for growth regulators are shown in Table 8. In general, efficacy and selectivity have to be tested on 2 crop species within each relevant subgroup as indicated.

Table 8: Required number of efficacy and selectivity tests for different crop-target combinations for growth regulators.

Possible crop-target combinations					Efficacy testing	Selectivity testing
Target name				Crop name		
	English	Dutch	French			
To control	excessive shoot and leaf growth	ongewenste scheut- en bladvorming	croissance excessive des tiges et des feuilles	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)
To stimulate	offsetting	vorming van uitlopers	production de stolons	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)
To stimulate	root growth	wortelgroei	croissance racinaire	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)
To stimulate	good flowering	goede bloemzetting	bonne mise à fleur	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)
To stimulate	branching	vertakking	ramification	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)
To control	too long flower peduncles	te lange bloemstelen	pédoncules floraux trop développés	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)
To control	too early flowering	te vroege bloei	floraisons trop précoces	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)

To control	late flowering	laattijdige bloei	floraison tardive	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)
To control	early wilting	vroegtijdige verwelking	flétrissement précoce	ornamentals or ornamental subgroup	2 plant species/subgroup	2 plant species/subgroup (if necessary)

## 3.7. Biological dossier of nematicides

Authorisations for 'common' nematicides as well as soil disinfectants can be granted in ornamentals. Efficacy and selectivity have to be tested on a sufficient numbers of crop species as indicated in Table 9 below.

Table 9: Required number of efficacy and selectivity tests for different crop-pest combinations for nematicides.

Possible crop-pest combinations					Efficacy testing	Selectivity testing
Pest name				Crop name		
Latin	English	Dutch	French			
<i>Nematoda</i>	nematodes	aaltjes (nematoden)	nématodes	ornamentals	Testing should cover the main types of nematodes: - Free living nematodes, e.g. <i>Longidoridae</i> , <i>Pratylenchidae</i> - Root nematodes, e.g. <i>Heteroderidae</i> , <i>Meloidogynidae</i> - Stem nematodes, e.g. <i>Anguinidae</i> - Leaf nematodes, e.g. <i>Aphelenchoïdes</i>	1 plant species/subgroup

### 3.8. Biological dossier of bactericides

The required number of efficacy and selectivity tests for different crop-disease combinations for bactericides are shown in Table 10. For efficacy, at least one species per entry group has to be tested to grant the authorisation. For example, an efficacy test on 1 *Agrobacterium* species would be sufficient to grant the authorisation on *Agrobacterium* in ornamentals. The selectivity has to be tested on a sufficient numbers of crop species (in general 1 species/subgroup).

Table 10: Required number of efficacy and selectivity tests for different crop-disease combinations for bactericides.

Possible crop-disease combinations					Efficacy testing	Selectivity testing
Disease name				Crop name		
Latin	English	Dutch	French			
<i>Agrobacterium</i>	<i>Agrobacterium</i>	<i>Agrobacterium</i>	<i>Agrobacterium</i>	ornamentals	1 species	1 species/subgroup
<i>Corynebacterium (Rhodococcus)</i>	<i>Corynebacterium</i>	<i>Corynebacterium</i>	<i>Corynebacterium</i>	ornamentals	1 species	1 species/subgroup
<i>Erwinia amylovora</i>	fireblight	bacterievuur	feu bactérien	ornamental broadleaf trees and shrubs	1 species	1 species/subgroup
<i>Pectobacteria carotovorum</i>	bacterial rot	bacterierot	pourriture bactérienne	ornamentals	1 species	1 species/subgroup
<i>Pseudomonas syringae</i> pv. <i>mors-prunorum</i>	bacterial canker	bacteriekanker	chancre bactérien	ornamentals	1 species	1 species/subgroup
<i>Xylella fastidiosa</i>	leaf scorch	Xylella	Xylella	ornamentals	1 species	1 species/subgroup

### 3.9. Biological dossier of molluscicides

The required number of efficacy and selectivity tests for different crop-pest combinations for molluscicides are shown in Table 11. For efficacy, at least one species per entry group has to be tested to grant the authorisation. The selectivity has to be tested on 1 species per subgroup.

Table 11: Required number of efficacy and selectivity tests for different crop-pest combinations for molluscicide.

Possible crop-pest combinations					Efficacy testing	Selectivity testing
Pest name				Crop name		
Latin	English	Dutch	French			
<i>Arionidae-Limacidae-Milacidae</i>	slugs	naakslakken	limaces	ornamentals	1 species	1 plant species/subgroup



## Annex 1 : Erysiphales species on various ornamental crops.

	<i>Erysiphe aquilegiae</i>	<i>Erysiphe cichoracearum</i>	<i>Erisiphe heraclei</i>	<i>Erisiphe horridula</i>	<i>Erisiphe knautiae</i>	<i>Erisiphe nitida</i>	<i>Erisiphe pisi</i>	<i>Erisiphe polygoni</i>	<i>Erisiphe polyphaga</i>	<i>Erisiphe ranuncoli</i>	<i>Erisiphe sp.</i>	<i>Microsphaera alni</i>	<i>Microsphaera alphitoides</i>	<i>Microsphaera berberides</i>	<i>Microsphaera euonymi</i>	<i>Microsphaera juglandis</i>	<i>Microsphaera polonica</i>	<i>Microsphaera sp.</i>	<i>Phyllactinia corylea</i>	<i>Phyllactinia gutata</i>	<i>Phyllactinia sp.</i>	<i>Podosphaera aucupariae</i>	<i>Podosphaera clandestina</i>	<i>Podosphaera leucotricha</i>	<i>Podosphaera oxycanthae</i>	<i>Podosphaera sp.</i>	<i>Sphaerotheca fuliginea</i>	<i>Sphaerotheca fusca</i>	<i>Sphaerotheca humuli</i>	<i>Sphaerotheca macularis</i>	<i>Sphaerotheca mors-uvvae</i>	<i>Sphaerotheca pannosa</i>	<i>Sphaerotheca sp.</i>	<i>Uncinula necator</i>	<i>Uncinula salicis</i>	<i>Uncinula sp.</i>	<i>Oidium chrysanthemi</i>	<i>Oidium sp.</i>	<i>Oidium violae</i>				
<i>Achillea</i>		X								X																																	
<i>Aconitum</i>							X			X																																	
<i>Anemone</i>					X					X																																	
<i>Aquilegia</i>	X						X			X																																	
<i>Aster</i>		X								X																																	
<i>Begonia</i>		X								X																																	
<i>Campanula</i>		X								X																																	
<i>Centaurea</i>		X					X			X																																	
<i>Cheiranthus</i>		X								X																																	
<i>Chrysanthemu</i>		X								X																													X	X			
<i>Coreopsis</i>		X					X			X																																	
<i>Dahlia</i>		X					X			X																																	
<i>Delphinium</i>							X		X	X																		X													X		
<i>Doronicum</i>										X																		X														X	
<i>Echinops</i>		X								X																																	
<i>Erigeron</i>																											X															X	
<i>Eryngium</i>			X							X																																	
<i>Fragaria</i>																														X											X		
<i>Gaillardia</i>		X								X																		X														X	
<i>Helenium</i>		X								X																																	
<i>Helianthus</i>		X								X																																	
<i>Inula</i>		X								X																																	
<i>Limonium</i>		X					X			X																																	

	<i>Erysiphe aquilegiae</i>	<i>Erysiphe cichoracearum</i>	<i>Erysiphe heraclei</i>	<i>Erysiphe horridula</i>	<i>Erysiphe knautiae</i>	<i>Erysiphe nitida</i>	<i>Erysiphe pisi</i>	<i>Erysiphe polygoni</i>	<i>Erysiphe polyphaga</i>	<i>Erysiphe ranuncoli</i>	<i>Erysiphe sp.</i>	<i>Microsphaera alni</i>	<i>Microsphaera alphitoides</i>	<i>Microsphaera berberides</i>	<i>Microsphaera euonymi</i>	<i>Microsphaera juglandis</i>	<i>Microsphaera polonica</i>	<i>Microsphaera sp.</i>	<i>Phyllactinia corylea</i>	<i>Phyllactinia gutata</i>	<i>Phyllactinia sp.</i>	<i>Podosphaera aucupariae</i>	<i>Podosphaera clandestina</i>	<i>Podosphaera leucotricha</i>	<i>Podosphaera oxycanthae</i>	<i>Podosphaera sp.</i>	<i>Sphaerotheca fuliginea</i>	<i>Sphaerotheca fusca</i>	<i>Sphaerotheca humuli</i>	<i>Sphaerotheca macularis</i>	<i>Sphaerotheca mors-uvuae</i>	<i>Sphaerotheca pannosa</i>	<i>Sphaerotheca sp.</i>	<i>Uncinula necator</i>	<i>Uncinula salicis</i>	<i>Uncinula sp.</i>	<i>Oidium chrysanthemi</i>	<i>Oidium sp.</i>	<i>Oidium violae</i>		
<i>Lupinus</i>					X	X	X			X																															
<i>Monarda</i>	X									X																															
<i>Myosotis</i>			X							X																															
<i>Papaver</i>								X		X																															
<i>Phlox</i>	X									X																															
<i>Physostegia</i>										X																															
<i>Primula</i>								X		X																															
<i>Rudbeckia</i>	X							X		X																															
<i>Salvia</i>	X									X																															
<i>Scabiosa</i>				X				X		X																															
<i>Senecio</i>	X									X																															
<i>Solidago</i>	X									X																															
<i>Solidaster.</i>	X									X																															
<i>Trollius</i>								X		X																															
<i>Veronica</i>																																								X	
<i>Viola</i>								X		X																														X	X
<i>Zinnia</i>	X									X																															
<i>Knolbegonia</i>	X									X																															

<i>Acer</i>																																									X	
<i>Aesculus</i>																																						X	X			
<i>Alnus</i>																				X																						
<i>Amelanchier</i>										X										X																						
<i>Carpinus</i>																	X																									
<i>Crataegus</i>																							X		X	X																

