Appendix E: Extrapolation possibilities
Category: Plant protection products

General remark:
This document is a translation of the Dutch Extrapolation Document, of the Board for the Authorisation of Plant Protection Products and Biocides and intends to give insight in extrapolation possibilities in The Netherlands.

Possibilities for the Extrapolation of Efficacy and Crop Safety Data of Plant Protection Products.

Version 2.0

Board for the Authorisation of Plant Protection Products and Biocides

Wageningen, The Netherlands, January 2014.

Preface

In commission for the Board for the Authorisation of Plant Protection Products and Biocides, the NVWA (former Plant Protection Service) explored the possibilities for extrapolation of efficacy and crop safety data of Plant Protection Products (PPP), in the period from 1996 – 1999, which resulted in this document, known as the extrapolation table, or the extrapolation document.

The document was updated in 2000, in 2003, and again in 2009. Attention was paid in the later versions to minor crops and to propagation materials. Several developments in the extrapolation of crops within a sector were detailed. The chapter on herbs was integrated in the chapter on vegetables (covered and field grown). The chapter on fruit was expanded with extrapolation possibilities for strawberry, fruit trees and rootstocks. The sections on nematodes were brought into the relevant chapters. The sometimes confusing terms for open field, under glass, greenhouse etc are replaced by protected culture and unprotected culture. The definitions for protected and unprotected culture can be found in chapter 1.2.

Contents

1 General

1.1 Introduction

Authorisation of Plant Protection Products (PPP) requires an evaluation of all uses applied for, according to regulation 1107/2009 (former directive 91/414/EEC). Much data is needed to make evaluation possible, and because of its costs this creates a barrier to application for authorisation, especially in the field of minor uses. In order to make the process as simple and as cost-effective as possible, data are extrapolated from one use to another. An inventory has been made of the possibilities for extrapolation of the efficacy- and phytotoxicity data of PPP for the control of insects, mites, fungi, weeds and nematodes in crops. Only extrapolations for the most common and/or important weeds, pests and diseases, have been dealt with, because this is where expertise is available.
This document is the Dutch guideline for the extrapolation of efficacy data used in the authorisation process of the Board for the Authorisation of Plant Protection Products and Biocides.

Aim:

The aim of this document is to create transparency in decision making to all involved parties and to encourage applicants to submit applications for an area of use as wide as possible without the necessity of added efficacy- or phytotoxicity data.

Conditions for use of the extrapolation lists

The extrapolation lists are meant to be used as guidance for the possibilities of extrapolation in a specific dataset. Case-specific conditions for extrapolation are given in the lists.
The extrapolation lists indicate the possibilities for extrapolation of the substance to a different organism or to a different crop. In order to make an extrapolation, one has to contemplate the whole system of PPP- target organism(s) - crop. The following aspects are relevant:

- All indicated extrapolations always concern the same plant protection products used in the same formulation and in the same dose.
- Control of the target organism in the extrapolated crops is done in the same way as in the crop for which the PPP was reviewed: timing of application, method, and frequency of application etc.
- The characteristics of the PPP should be considered because they are important (whether the product is systemic or not, has preventive versus curative effects, etc).
- In case the mode of action of the PPP 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 lists.
- The properties of the crops should be taken into account (woody, perennial, annual, growth habit, type of produce etc.)
- The life histories of the target organisms should be taken into account (e.g. hidden life style)
- The most sensitive crop should be reviewed if any difference in sensitivity between crops is known to exist.
- Comparative damage in the reviewed crop - pest, disease and/or weed combination and the extrapolated crop should not differ.
- Both cropping systems and husbandry practices of individual crops should be taken into account (e.g. open field crops, protected crops, use of irrigation)
- 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 acting herbicides, soil treatments, such as granular formulations, and wet soil sterilisation products.
- 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.

Status of this document

The extrapolations are based on:
- Decisions taken by the Board for the Authorisation of Plant Protection Products and Biocides (Ctgb);
- Recommendations given by the division of Integrated Crop Protection of the Plant Protection Service to Ctgb;
- Consultation with experts from research institutes and stake holders;
- Recommendations given by experts with practical experience.

The Dutch crop protection data bank (GBK) and crop protection guide (Gewasbeschermingsgids) have been used as a source of background information.

The extrapolations are based on the present knowledge of extrapolations.

1.2 Method

The possibilities for extrapolations have been examined for the following crop groups:

- Arable farming/ grass seed herbage crops
- Flower bulb and bulb flower crops
- Flower crops (unprotected)
- Flower crops (protected)
- Ornamental crops (protected)
- Nursery stock
- Edible mushrooms
- Fruit growing
- Vegetables (unprotected)
- Vegetables (protected).

The possibilities for extrapolation of seed treatments are also investigated. During the last revision, focus of attention was extrapolation of 'minor crops'.
Extrapolations specifically connected to a particular product are not included in this document.

Definition protected culture / unprotected culture

Protected culture:	Crops grown under glass or plastic in which there is no continuous open contact with the atmosphere. This also includes cu. Crops grown inside (covered space) other than greenhouses or tunnels, are also considered to be protected cultivation.
Unprotected culture:	Crops not grown under glass or plastic greenhouses / tunnels. There is a continuous open contact with the atmosphere.

The document follows the above structure of crop groups. Within every crop a second level is used, based on target organism. Every chapter has subchapters devoted to efficacy and to crop safety.

Efficacy

First the target organisms are indicated. Wherever possible the common name as well as the scientific name is included. The standard organism is the organism that causes the damage: e.g. aphids in case of relevant sucking damage, and virus in case the virus, transmitted by aphids, is the main cause of the damage done.

Second the most suitable standard crop is indicated with its official common name.

The choice of the standard test crop determines to a large degree the possibilities for extrapolation. Factors that play a role are for instance sensitivity of the crop to the relevant harmful organisms, and life history of the organism in the crop.
Of course data obtained from research in cultivars of the crop resistant against the target should not be considered.
In as far as different standard test crops and standard test organisms are mentioned the standard test organism is mentioned after the name of the standard test crop. The choice of standard test organisms and standard test crops does not imply that other choices are not possible. As far as possible the choice of the review organism and the review crop is explained.

Next, the possibilities for extrapolation are listed, starting with extrapolations from the standard test organism. Here there are different possibilities: extrapolation is possible for the same organism to other crops, and extrapolation is possible from the standard test organism to different organisms belonging to the same genus. As far as possible and relevant, an explanation is provided.
Listed are the possibilities for extrapolation from standard test crops to the crops to be extrapolated to. As far as possible also here the underlying considerations are given.

Crop safety (harmful effects/phytotoxicity)

In generating data for the evaluation of harmful effects/phytotoxicity two possibilities exist, both influencing the possibilities for extrapolation:
a) Determination of phytotoxicity in efficacy trials.
b) Determination of phytotoxicity in separate trials.

Sub a) Phytotoxicity may be determined in the efficacy trials; under the heading “extrapolation possibilities” it is indicated to which crops extrapolation is possible from the review crop.

Sub b) A list of review crops is presented which are included in the phytotoxicity research. As far as possible explanatory remarks are included. Included is for which crops data from the review crops may be extrapolated.

In making a choice of review crops for the research on phytotoxicity we took note of:
- The frequent occurrence of the relevant target organism in the crop. It does not make sense to choose a crop in which the target organism hardly ever needs control.
- The area of the review crop should be reasonably large. In dealing with a very small acreage the chances that damage occurs are small, when compared to a crop that is equally sensitive to phytotoxicity but is grown on a larger scale.

In fact, data should be obtained that enable an optimal risk analysis of the chances that phytotoxicity will occur. In a number of cases crops have been included because either the crop is very sensitive to crop protection products or both the pest occurs very commonly and the crop is sensitive to crop protection products. Wherever this has been done it has been indicated in the list.

In floriculture, arboriculture, flower bulbs, bulb flowers and perennial ornamental plants, all crop groups usually consist of a vast number of species and cultivars, and normally phytotoxicity has large economic effects. Because of this it is necessary to include a restriction on the label indicating the possibility of phytotoxicity and advising the farmer to make a small-scale field test first.

N.B. Wherever **and** is stated in the paragraphs on efficacy and harmful effects/phytotoxicity for review organisms and review crops it means that data have to be present on all mentioned review organisms and review crops, **or** means that choice is possible.

1.3 Extrapolation between growing systems

In the individual extrapolation lists a number of possible extrapolations between different growing systems is presented.

1.3.1 Efficacy

For extrapolations between growing systems the same conditions as described under 1.1 apply.

1.3.2 Harmful effects

Conditions for the extrapolation between growing systems are relevant to harmful effects.
In general crops, and therefore crop groups, differ in their sensitivity to phytotoxicity. Because of this, it is normally not possible to extrapolate between the various crop groups. In exceptional cases possibilities are indicated on the individual lists.

2 ARABLE FARMING

2.1 Potato late blight

2.1.1 Efficacy

Test organism

- potato late blight — - *Phytophthora infestans*

Test crop

A ware potato variety that is susceptible for *Phytophthora infestans* in both the leaves and the tubers for example the cultivar 'Bintje'.

Most of the research should be conducted on clay soils or sandy clay soils because the change on tuber infection is higher on that type of soils. In this way it is possible to evaluate the effects on tuber infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- ware potato	- industrial potato and seed potato

Extrapolation is not possible from industrial potato and seed potato to ware potato because the number of treatments is higher in ware potatoes. Most of the ware potato varieties are more susceptible to potato late blight compared to industrial potatoes.

2.1.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- ware potato

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- ware potato	- industrial potato and seed potato

Based on practical experiences extrapolation of phytotoxicity is possible from ware potato to industrial potato and seed potato.

2.2 Leaf and ear diseases in wheat

The extrapolation has reference to a treatment of the crop.

2.2.1 Efficacy

Test organism

- leaf disease and ear diseases	- powdery mildew	*(Erysiphe graminis* f.sp*. tritici)*
	- Septoria leaf spot and glume blotch	*(Mycosphaerella graminicola* = *Septoria tritici* and *Leptosphaeria nodorum*)
	- brown rust	*(Puccinia recondita* f.sp. *tritici)*
	- yellow rust	*(Puccinia striiformis)*
	- tan spot	*- Helminthosporium tritici-repentis*
	- Fusarium ear blight	*- Fusarium* spp

Test crop

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible from one test organism to another or to another fungi. Based on practical experience it is known that if *Mycosphaerella graminicola* can be well controlled, *Leptosphaeria nodorum* (leaf infection) can be well controlled too. A few trials against *Leptosphaeria nodorum* will be sufficient if a product controls *Mycosphaerella* well.

Several fungi can cause leaf and ear diseases. Extrapolation is not possible from one mycosis to another mycosis. To claim all diseases that can cause leaf and ear diseases in wheat trials for each fungus species should be conducted. Powdery mildew and *Septoria* leaf spot can infect both leaves and ears. Research should be conducted with regard to infection of the leaves as well as with regard to infection of the ears.
Powdery mildew (leaf infection), yellow rust and brown rust can infect wheat early in the growing season and later in growing season. Extrapolation is possible from the treatment early in season to the treatment later in season.

b) Crops

From:	To:
- winter wheat	- spring wheat, winter rye triticale, spelt and teff

Extrapolation is not possible from spring wheat to winter wheat because the infection level is lower in spring wheat.
Extrapolation is possible from winter wheat to spring wheat, triticale, spelt and teff because in these crops same diseases can be found and infection level is lower.

2.2.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter wheat	- spring wheat, triticale, spelt
- spring wheat	- winter wheat

Extrapolation is not possible to teff because susceptibility of teff for pesticides is not very well known.

2.3 Leaf blotch scald in barley

The extrapolation has reference to a treatment of the crop.

2.3.1 Efficacy

Test organism

- leaf blotch - *Rhynchosporium secalis*

Test crop

-winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolations to other organisms are not possible.

b) crops

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

Extrapolation is possible between both crops because no differences exist in infection level or susceptibility.

2.3.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

2.4 Leaf spot in beet

The extrapolation has reference to a treatment of the crop.

2.4.1 Efficacy

Test organism

- Cercospora leaf spot	-*Cercospora beticola*
- Ramularia leaf spot	- *Ramularia beticola*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

- Cercospora leaf spot	- *Cercospora beticola*
- Ramularia leaf spot	- *Ramularia beticola*

Extrapolation is not possible between *Cercospora beticola* and *Ramularia beticola*.

b) Crops

From:	To:
- sugar beet	- fodder beet

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of much more importance compared to fodder beet.
Extrapolation to red beet is not possible because no expert judgement is available and the timing of infection differs from sugar or fodder beet.

2.4.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet

2.5 Mildew, powdery mildew in wheat

The extrapolation has reference to a treatment of the crop.

2.5.1 Efficacy

Test organism

- powdery mildew — *- Erysiphe graminis f.sp. tritici (Blumeria graminis)*

Powdery mildew causes leaf infection in an early stage of the growing season. Powdery mildew causes leaf and ear diseases is described in section 2.2.

Test crop

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- powdery mildew	- leaf infection (as part of the leaf diseases) caused by powdery mildew

b) Crops

From:	To:
- winter wheat	- spring wheat, triticale, spelt and teff

Extrapolation is not possible from spring wheat to winter wheat because the infection level is lower in spring wheat.
Extrapolation is possible from winter wheat to spring wheat, triticale, spelt and teff because in these crops the same diseases can be found and the infection level is lower.

2.5.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter wheat	- spring wheat, triticale and spelt
- spring wheat	- winter wheat

Extrapolation is not possible to teff because there is not much knowledge of the susceptibility of teff for pesticides.

2.6 Mildew, powdery mildew in barley

The extrapolation has reference to a treatment of the crop.

2.6.1 Efficacy

Test organism

- powdery mildew	- *Erisyphe graminis f.sp. hordei (Blumeria graminis)*

Test crop

- winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

Extrapolation is possible between both crops because no differences exist in infection level or susceptibility.

2.6.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

2.7 Mildew, powdery mildew in grass seed production

The extrapolation has reference to a treatment of the crop.

2.7.1 Efficacy

Test organism

- powdery mildew *Erysiphe graminis (Blumeria graminis)*

Test crop

- smooth-stalked meadow grass **or**
- English ryegrass **or**
- red fescue

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- smooth-stalked meadow grass	- English ryegrass and red fescue
- English ryegrass	- smooth-stalked meadow grass and red fescue
- red fescue	- English ryegrass and smooth-stalked meadow grass

Extrapolation is possible between these crops because no differences exist in level of infection or susceptibility.

2.7.2 Phytotoxicity

Extrapolation is possible for the direct effect on the crops. Extrapolation is not possible for the effects on the germinal force of the seed.

Test crops

- smooth-stalked meadow grass **or**
- English ryegrass **or**
- red fescue

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- smooth-stalked meadow grass	- English ryegrass and red fescue
- English ryegrass	- smooth-stalked meadow grass and red fescue
- red fescue	- English ryegrass and smooth-stalked meadow grass

Extrapolation is only possible for the direct crop reactions. Extrapolation is not possible for the effects on the germinal force of the seed and the yield of seed.

2.8 Net blotch in barley

The extrapolation has reference to a treatment of the crop.

2.8.1 Efficacy

Test organism

- net blotch — - *Pyrenophora teres* f.sp. *teres*

Test crop

- winter barley

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- winter barley	- spring barley

Extrapolation is not possible from spring barley to winter barley because the infection level is lower in spring barley.

2.8.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

Note: no differences exist between both crops in susceptibility for phytotoxicity. As contrasted with the efficacy, extrapolation is possible from spring barley to winter barley for phytotoxicity.

2.9 Rust, brown rust in wheat

The extrapolation has reference to a treatment of the crop.

2.9.1 Efficacy

Test organism

- brown rust - *Puccinia recondita* f.sp. *tritici*

Brown rust meant causes infection in an early stage of the growing season. Brown rust can also causes infection in a later stage of the growing season; this is described in section 2.2.

Test crop

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- brown rust	- leaf- and ear diseases caused by brown rust

b) Crops

From:	To:
- winter wheat	- spring wheat, triticale, spelt and teff

Extrapolation is not possible from spring wheat to winter wheat because the infection level is lower in spring wheat.
Extrapolation is possible from winter wheat to spring wheat, triticale, spelt and teff because in these crops same diseases can be found and the infection level is lower.

2.9.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter wheat	- spring wheat, triticale and spelt
- spring wheat	- winter wheat

Extrapolation is not possible to teff because there is to little knowledge of susceptibility of teff for pesticides.

2.10 Rust, brown rust in barley

The extrapolation has reference to a treatment of the crop.

2.10.1 Efficacy

Test organism

- brown rust - *Puccinia hordei*

Test crop

- winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

Extrapolation is possible between both crops because no differences exist in infection level.

2.10.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

2.11 Rust, yellow rust in wheat

The extrapolation has reference to a treatment of the crop.

2.11.1 Efficacy

Test organism

- yellow rust — - *Puccinia striiformis* f.sp. *tritici*

Yellow rust causes infection in an early stage of the growing season. Yellow rust can also causes infection in a later stage of the growing season; this is described in section 2.2.

Test crop

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- yellow rust	- leaf- and ear diseases caused by yellow rust

b) Crops

From:	To:
- winter wheat	- spring wheat, triticale, spelt and teff

Extrapolation is not possible from spring wheat to winter wheat because the infection level is lower in spring wheat.
Extrapolation is possible from winter wheat to spring wheat, triticale, spelt and teff because in these crops same diseases can be found and the infection level is lower.

2.11.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter wheat	- spring wheat, triticale and spelt
- spring wheat	- winter wheat

Extrapolation is not possible to teff because there is not much knowledge susceptibility of teff for pesticides.

2.12 Rust, yellow rust in barley

The extrapolation has reference to a treatment of the crop.

2.12.1 Efficacy

Test organism

- yellow rust — - *Puccinia striiformis* f.sp. *hordei*

Test crop

- winter barley
or
- wpring barley

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

Extrapolation is possible between both crops because no differences exist in infection level or susceptibility for infection.

2.12.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter barley
or
- spring barley

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter barley	- spring barley
- spring barley	- winter barley

2.13 Rust in grass seed cultivation

The extrapolation has reference to a treatment of the crop.

2.13.1 Efficacy

Test organism

- black stem rust	- *Puccinia graminis* subsp. *graminicola*
or	
- cCrown rust	- *Puccinia coronata* sp *coronata*
or	
- brown spotting rust	- *Puccinia brachypodii* sp. *poae-nemoralis*
or	
- orange line rust	- *Puccinia poarum*

Test crop

- English ryegrass	black stem rust and crown rust
- smooth-stalked meadow grass	orange line rust and brown spotting rust

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- black stem rust	- crown rust, brown spotting rust, orange line rust
- crown rust	- black stem rust, brown spotting rust, orange line rust
- brown spotting rust	- black stem rust, crown rust, orange line rust
- oorange line rust	- black stem rust, crown rust, brown spotting rust

b) Crops

From:	To:
- English ryegrass	- smooth-stalked meadow grass, red fescue
- smooth-stalked meadow grass	- English ryegrass, red fescue

2.13.2 Phytotoxicity

Extrapolation is possible for the direct effects on the crops. These effects can be assessed in the efficacy trials. Extrapolation is not possible for the effects on the germinal force of the seed.

Test crops

- smooth-stalked meadow grass **or**
- English ryegrass **or**
- red fescue

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- smooth-stalked meadow grass	- English ryegrass, red fescue
- English ryegrass	- smooth-stalked meadow grass, red fescue
- red fescue	- smooth-stalked meadow grass, English ryegrass

Extrapolation is only possible for the direct crop reactions. Extrapolation is not possible for the effects on the germinal force of the seed and the yield of seed.

2.14 Aphids potato's (sucking damage)

The extrapolation has reference to a treatment of the crop.

2.14.1 Efficacy

Test organism

- green peach aphid - *Myzus persicae*
- buckthorn aphid - *Aphis nasturtii*

Extrapolation is not possible between those aphids. They are mentioned together because they can be found in the same period of the growing season.

Test crop

- ware potato
or
- industrial potato

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible from green peach aphid to other organisms. Extrapolation is not possible from buckthorn aphid to other organisms. Although it is much more difficult to control the buckthorn aphid compared to the green peach aphid there is no knowledge if efficacy of products can be extrapolated to the green peach aphid. No extrapolation is possible from the green peach aphid to buckthorn aphid.

Other aphids can cause sucking damage too. It is not known whether extrapolation is possible from the green peach aphid or buckthorn aphid to these other aphid species. Besides the buckthorn aphid also *Aphis frangulae* causes a lot of damage in autumn. This species has no Dutch name but it is closely related to cotton aphid and changes host plants with alder buckthorn. Possibilities for extrapolations are not known.

b) Crops

From:	To:
- ware potato	- industrial potato
- industrial potato	- ware potato

Extrapolation is only possible from industrial potato to ware potato when research is conducted in the same period in which aphids can usually be found in ware potatoes. In seed potato sucking damage is less important because growing season of seed potato is shorter. Furthermore most of the time the control of aphids to prevent sucking damage will take place after the longest day. Therefore research should not conduct in seed potatoes.

2.14.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- ware potato
or
- industrial potato

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- ware potato	- industrial potato
- industrial potato	- ware potato

2.15 Aphids in potato (False top roll)

The extrapolation has reference to a treatment of the crop.

2.15.1 Efficacy

Test organism

- potato aphid - *Macrosiphum euphorbiae*

Test crop

- ware potato
or
- industrial potato

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

Potato aphid is mentioned separately because assessment method differs from the method of other aphids.
Assessments should be occurred on the symptoms of the crop and should not be done by counting the aphids.

b) Crops

From:	To:
- ware potato	- industrial potato
- industrial potato	- ware potato

Potato aphid should be controlled around half June. Therefore no special conditions have to be considered for extrapolation from industrial potato to ware potato. Potato aphid is not important for seed potato.

2.15.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- ware potato
or
- industrial potato

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- ware potato	- industrial potato
- industrial potato	- ware potato

2.16 Aphids beets (sucking damage)

The extrapolation has reference to a treatment of the crop.

2.16.1 Efficacy

Test organism

- black bean aphid - *Aphis fabae*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet to sugar beet or red beet. In general research will be conducted in sugar beet because of the area of sugar beet is of much more importantly compared to fodder beet or red beet.

2.16.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.17 Aphids beets (virus transmission)

The extrapolation has reference to a treatment of the crop.

2.17.1 Efficacy

Test organism

- green peach aphid - *Myzus persicae*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- green peach aphid	- shallot aphid *(Myzus ascalonicus)*

Extrapolation is not possible from shallot aphid to green peach aphid. Virus transmission from the shallot aphid is not as effective as from the peach potato aphid.
The efficacy of the products is also based on the virus symptoms of the crop.

b) Crops

From:	To:
- sugar beet	- fodder beet

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of much more importance compared to fodder beet.

2.17.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet

2.18 Aphids cereals (sucking damage)

The extrapolation has reference to a treatment of the crop.

2.18.1 Efficacy

Test organism

- grain aphid	- *Sitobion avenae*
or	
- rose grain aphid	- *Metopolophium dirhodum*
or	
- bird cherry aphid	- *Rhopalosiphum padi*

Test crop

- winter wheat **or**
- spring wheat

No expert judgement is available if barley is a suitable test crop. Till now research had often been conducted in wheat and most of the time in winter wheat.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- grain aphid	- rose grain aphid and bird cherry aphid
- rose grain aphid	- grain aphid and bird cherry aphid
- bird cherry aphid	- grain aphid and rose grain aphid

b) Crops

From:	To:
- winter wheat	- spring wheat, triticale, spelt, winter barley, spring barley
- spring wheat	- winter wheat, winter barley, spring barley

2.18.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter wheat **or**
- spring wheat

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter wheat	- spring wheat, triticale, spelt, winter barley, spring barley
- spring wheat	- winter wheat, winter barley, spring barley

Extrapolation is not possible to teff because there is no expert judgement on susceptibility of teff for pesticides.

2.19 Potato stem borer in beet

The extrapolation has reference to a treatment of the crop.

2.19.1 Efficacy

Test organism

- potato stem borer - *Hydraecia micacea*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of much more importance compared to fodder beet.

2.19.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet

2.20 Cutworms

The extrapolation has reference to a treatment of the soil.

2.20.1 Efficacy

Test organism

- cutworm — *- Agrotis spp.*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet and red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of much more importance compared to fodder beet or red beet.

2.20.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.21 Flea beetles in beet

The extrapolation has reference to a treatment of the crop.

2.21.1 Efficacy

Test organism

- flea beetle
- *Phyllotreta* spp

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet and red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of much more importance compared to fodder beet and red beet.

2.21.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.22 Pigmy mangold beetle

The extrapolation has reference to a treatment of the crop.

2.22.1 Efficacy

Test organism

- pigmy mangold beetle - *Atomaria linearis*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet and red beet to fodder beet and red beet.

2.22.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.23 Collembola

The extrapolation has reference to a treatment of the crop.

2.23.1 Efficacy

Test organism

- collembola - *Onychiurus armatus*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet or red beet.

2.23.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.24 Beet fly

The extrapolation has reference to a treatment of the crop.

2.24.1 Efficacy

Test organism

- beet fly - *Pegomya betae*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet or red beet.

2.24.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.25 Mangold flea beetle

The extrapolation has reference to a treatment of the crop.

2.25.1 Efficacy

Test organism

- mangold flea beetle - *Chaetocnema concinna*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet.

2.25.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.26 Colorado beetle

The extrapolation has reference to a treatment of the crop.

2.26.1 Efficacy

Test organism

- Colorado beetle — *- Leptinotarsa decemlineata*

Test crop

- ware potato **or**
- industrial potato **or**
- seed potato

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- ware potato	- industrial potato and seed potato and volunteer potatoes in other crops
- industrial potato	- ware potato and seed potato and volunteer potatoes in other crops
- seed potato	- ware potato and industrial potato and volunteer potatoes in other crops

2.26.2 Phytotoxicity

Phytotoxicity can be observed in the efficacy tests if research was conducted in a potato crop. Phytotoxicity research should be conducted in the same crop in which volunteer potato should be controlled.

Test crops

- ware potato **or**
- industrial potato **or**
- seed potato

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- ware potato	- industrial potato and seed potato
- industrial potato	- ware potato and seed potato
- seed potato	- ware potato and industrial potato

2.27 Beet carrion beetle

The extrapolation has reference to a treatment of the crop.

2.27.1 Efficacy

Test organism

- beet carrion beetle - *Aclypea opaca*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet.

2.27.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet

2.28 Spotted millepede in beet

The extrapolation has reference to a treatment of the soil.

2.28.1 Efficacy

Test organism

- spotted millepede - *Blaniulus guttulatus*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet or red beet.

2.28.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.29 Caterpillar in beet

The extrapolation has reference to a treatment of the crop.

2.29.1 Efficacy

Test organism

- caterpillar — - *Noctuidae*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- caterpillar from family *Noctuidae*	- other caterpillars of the same family

No expert judgement is known for extrapolation from caterpillars of the family *Noctuidae* to caterpillars of other families.

b) Crops

From:	To:
- sugar beet	- fodder beet

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet.

2.29.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet

2.30 Cabbage thrips in beet

2.30.1 Efficacy

Test organism

- cabbage thrips in beet — - *Thrips angusticeps*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet or red beet.

2.30.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.31 True bugs in beet

2.31.1 Efficacy

Test organism

- true bugs — *- Heteroptera*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. In general research will be conducted in sugar beet because of the area of sugar beet is of more importance compared to fodder beet or red beet.

2.31.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Sugar beet

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sugar beet	- fodder beet, red beet

2.32 Weeds

2.32.1 Efficacy

Test organisms

- annual grasses	e.g. annual meadow grass, barnyard grass, black grass
- ryegrasses	e.g. English ryegrass
- volunteer cereals	e.g. wheat, barley
- annual dicotyledonous weeds	e.g. common chickweed, fat hen, red shank, cleavers
- perennial grasses	e.g. quack grass
- perennial dicotyledonous weeds	e.g. creeping thistle, amphibious bistort

Weeds mentioned are common species in the culture of arable farming crops. Nevertheless other weed species can be suitable as a test weed.

Test crops

If time of treatment, the covering of the soil by the crop and the species of weeds are comparable it is not important in which crop research has been conducted.
For soil acting herbicides the kind of soil is also important.

POSSIBILITIES OF EXTRAPOLATION

a) Weeds

From:	To:
- a specific weed specie in a crop	- the same weed specie in other crops
- from one group of test weeds (e.g. annual grasses) at least three species should be tested *)	- other weed species of the same group

Extrapolation is not possible from one weed species to another because susceptibility of weed species can be different. Extrapolation to a whole group of weed species (e.g. annual weeds) is possible when at least three species of that group have been tested and results are sufficient. This does not mean that all weed species from that group will be controlled. Weeds that will be controlled should be mentioned on the label.
For perennial dicotyledonous weeds and perennial grasses extrapolation to the group is not possible. These weeds are very specific therefore for each weed specie research is needed.

b) Crops

From:	To:
- use of contact acting herbicides in an open crop	- use of the same contact acting herbicides in a crop that close faster (the other way around is not possible)

2.32.2 Phytotoxicity

Test crops

In general extrapolation is not possible from one crop to another crop. This is the case for both soil-acting herbicides and for contact acting herbicides.
Exceptions are mentioned below.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- use before sowing, planting or emergence of a certain crop (only contact acting herbicides)	- use before sowing, planting or emergence of another crop (only for contact acting herbicides)
- seed potato	- ware potato or industrial potato. Extrapolation is not possible the other way around because of the high demands of seed potato and the growth period of seed potato is shorter
- ware potato	- industrial potato Extrapolation is not possible the other way around because the growth of ware potato is shorter
- sugar beet	- fodder beet
- fodder beet	- sugar beet
- winter barley	- winter wheat
- spring barley	- wpring wheat
- silage maize	- grain maize
- kernel maize	- maize for silage
- Italian ryegrass	- English ryegrass. Extrapolation is not possible the other way around because Italian ryegrass can be more susceptible for herbicides
- witloof chicory, root production	- chicory, root production
- broad beans	- other *Vicea* species. Extrapolation is not possible the other way around because broad beans can be more susceptible for herbicides
- dwarf snap bean	- other *Phaseolus* species. Extrapolation is not possible the other way around because dwarf snap beans can be more susceptible for herbicides
- garden pea	- other *Pisum* species. Extrapolation is not possible the other way around because garden peas can be more susceptible for herbicides
- hard fescue	- red fescue Extrapolation is not possible the other way around because hard fescue can be more susceptible for herbicides

Cereals
Phytotoxicity research can be conducted in winter wheat, rye, spring barley and oat if all cereals will be claimed. If no phytotoxicity is observed in crops mentioned extrapolation is possible to winter barley, triticale, spring wheat and spelt. Extrapolation is not possible to teff because susceptibility of teff for pesticides is not known.

Phytotoxicity research can only be conducted in winter barley if winter cereals will be claimed. If no phytotoxicity is observed extrapolation is possible from winter barley to winter wheat, rye, triticale and spelt.

Maize
The yield of maize for silage is the yield of the whole plant. The yield of kernel maize is just the kernels. The plant grew good when the yield of grains is sufficient. This information can be extrapolated to maize for silage.
Conditions is that yield of the trails is consistent.

3 FLOWER BULB- AND BULB FLOWERCROPS

3.1 Nematodes in flower bulb- and flower tuber crops

3.1.1 Efficacy

Test organism

- stubby root nematodes
- root-lesion nematode
- *Trichodorus* spp.
- *Pratylenchus penetrans*

Test crop
- tulip or gladiolus (stubby root nematodes)
- narcissus or lily (root-lesion nematode)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- stubby root nematodes	- *Trichodorus* in all flower bulb- and flower tuber crops
- root-lesion nematode	- *Pratylenchus penetrans* in all flower bulb- and flower tuber crops

Trichodorus and *Pratylenchus penetrans* are the most important nematodes in flower bulb- and flower tuber crops. *Trichodorus* is a problem in tulip and gladiolus, and *Pratylenchus penetrans* is a problem in lily and narcissus. Beside these species other nematodes can be a problem, but they are of minor concern.

When *Trichodorus* and *Pratylenchus penetrans* are sufficiently controlled by a specific crop protection product, other nematodes in flower bulbs and flower tuber crops will also be controlled. When good control of *Trichodorus* and *Pratylenchus penetrans* is found, extrapolation is possible to all other nematodes in flower bulbs and flower tuber crops. The method of controlling of these nematodes should be the same as the method of controlling *Trichodorus* and *Pratylenchus penetrans*.

b) crops

From:	To:
- tulip or gladiolus	- other flower bulb- and flower tuber crops and bulb flowers where *Trichodorus* occurs
- narcissus or lily	- other flower bulb- and flower tuber crops and bulb flowers where *Pratylenchus* occurs

Extrapolation is possible from the results in the test crops to all other flower bulb- and flower tuber crops. For *Trichodorus* this is possible in tulip and gladiolus, and in lily or narcissus for *Pratylenchus penetrans.* The chosen test crop should not have resistance against the pathotype.

3.1.2 Phytotoxicity

Can be observed in the efficacy trials.

Test crops
tulip and lily

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- tulip and lily and gladiolus	- other flower bulb- and flower tuber crops and bulb flowers

3.2 Botrytis (fire blight infection in the field)

Reference of the extrapolation is the treatment of a crop.

3.2.1 Efficacy

Test organism

- fire blight in tulip	- *Botrytis tulipae*
- fire blight in lily	- *Botrytis elliptica*
- fire blight in gladiolus	- *Botryotinia draytonii*, *Botrytis gladiolorum*

B. tulipae and *B. elliptica* are the most important fungi which can cause fire blight and give the highest damage followed by *B. gladiolorum*. In order to make the extrapolation as broad as possible, *B. gladiolorum* should also be tested. *B. gladiolorum* is the sexual stage of *Botryotinia draytonii*.

Test crop

- tulip	*(Botrytis tulipae)*
- lily (Asiatic or longiflorum type)	*(Botrytis elliptica)*
- gladiolus	*(Botryotinia draytonii*, *Botrytis gladiolorum)*

These test crops are the most susceptible for this disease of all flower bulb and flower tuber crops. The Asiatics and longiflorums are the most susceptible lily types. Compared to gladiolus, tulip and lily are more susceptible for fire blight. In order to make the extrapolation as broad as possible, trials should be conducted in gladiolus also.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- *Botrytis tulipae*	- *Botrytis tulipae* in all flower bulb- and flower tuber crops and bulb flowers
- *Botrytis elliptica*	- *Botrytis elliptica* in all flower bulb- and flower tuber crops and bulb flowers
- *Botryotinia draytonii*	- *Botryotinia draytonii* in all flower bulb- and flower tuber crops and bulb flowers
- *Botrytis gladiolorum*	- *Botrytis gladiolorum* in all flower bulb- and flower tuber crops and bulb flowers

Fire blight is caused by different *Botrytis* species like *B. gladiolorum*, *B. tulipae* and *B. elliptica*. When trials are conducted in the above mentioned test crops with these *Botrytis* subspecies, extrapolation is possible to all *Botrytis* subspecies which can cause leaf fire blight in all flower bulb-, flower tuber crops and bulb flowers.

b) crops

From:	To:
- tulip	- all flower bulb- and flower tuber crops and bulb flowers in which *Botrytis tulipae* occurs
- lily	- all flower bulb- and flower tuber crops and bulb flowers in which *Botrytis elliptica* occurs*
- gladiolus	- all flower bulb- and flower tuber flower crops and bulb flowers in which *Botryotinia draytonii* occurs

* Extrapolation from lily to other crops is only possible when there are no differences between the fire blight control strategy or other factors which have influence on this strategy (like differences in dose rate, applying other plant protection products which influence the effect on fire blight).

Extrapolation to all flower bulb-, flower tuber crops and bulb flowers in which fire blight occurs, is possible when trials are conducted in all three test crops (tulip, lily and gladiolus).

3.2.2 Phytotoxicity

Phytotoxicity can be observed in the efficacy trials.
The influence of the product on the yield has to be observed in phytotoxicity trials in varieties of tulip, lily and gladiolus, which are not susceptible for fire blight. The influence of fire blight on the yield will be excluded in this way. The influence of the product on the crop and yield will be clear.

Test crops

- tulip
- lily (Asiatic or longiflorum type)
- gladiolus

Of all flower bulb/ flower tuber crops these test crops are the most susceptible for phytotoxicity. Compared to gladiolus, tulip and lily are more susceptible for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

It is not possible to extrapolate from one test crop to other crops. Extrapolation to all other flower bulb- and flower tuber crops and bulb flowers is possible when trials are conducted in tulip and lily and gladiolus.

From:	To:
- tulip and lily and gladiolus	- all other flower bulb- and flower tuber crops and bulb flowers

3.3 Fusarium (Fusarium bulb rot)

Reference of the extrapolation is the treatment of bulbs or flower tubers in unprotected productions or forcing culture of flower bulb- or flower tuber crops.

3.3.1 Efficacy

Test organism

- Fusarium bulb rot in tulip	- *Fusarium oxysporum* f.sp*. tulipae*
- Fusarium bulb in gladiolus	- *Fusarium oxysporum* f.sp*. gladiolus*

These two fungi are the most important ones.

Test crop

- tulip	*F. oxysporum* f.sp*. tulipae*
- gladiolus	*F. oxysporum* f.sp*. gladiolus*

These test crops are the most susceptible for this disease of all flower bulb and flower tuber crops. When the unprotected production and the forcing culture are claimed, trials should be conducted in both cultures.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Fusarium oxysporum* f.sp. *tulipae*	- *Fusarium oxysporum* f.sp. *tulipae* in all flower bulb- and flower tuber crops respectively bulb flowers (forcing culture)
- *Fusarium oxysporum* f.sp. *gladiolus*	- *Fusarium oxysporum* f.sp.*gladiolus* in all flower bulb- and flower tuber crops respectively bulb flowers (forcing culture)

When trials are conducted with *Fusarium oxysporum* f.sp. *tulipae* and *Fusarium oxysporum* f.sp. *gladiolus*, extrapolation is possible to all *Fusarium oxysporum* sub species.
Products that perform well against *Fusarium oxysporum* f.sp. *tulipae* and *Fusarium oxysporum* f.sp. *gladiolus* in practice also perform well against other sub species of *Fusarium oxysporum*.

b) crops

From:	To:
- tulip	- al flower bulb- and flower tuber crops respectively bulb flowers (forcing culture) in which *Fusarium oxysporum* f.sp. *tulipae* occurs
- gladiolus	- all flower bulb- and flower tuber crops respectively bulb flowers (forcing culture) in which *Fusarium oxysporum* f.sp. *gladiolus* occurs

When trials are conducted in both test crops, extrapolation is possible to all flower bulb- and flower tuber crops respectively bulb flowers (forcing culture) in which *Fusarium oxysporum* occurs, except narcissus. The bulbs of narcissus are treated with warm water. The performance of the product can be influenced by this treatment. To claim this crop, trials are needed in narcissus.
Extrapolation from unprotected cultures to the forcing culture or the other way around is not possible.

3.3.2 Phytotoxicity

If the unprotected production and the forcing culture are claimed, trials should be conducted in both cultures. See possibilities of extrapolation also.

Phytotoxicity in tulip and gladiolus can be observed in the efficacy trials. When all flower bulb crops are claimed, phytotoxicity trials need to be conducted in lily also.
The influence of the product on the yield must be observed in phytotoxicity trials in varieties of tulip, lily and gladiolus, which are not susceptible for *Fusarium oxysporum*. The influence of *Fusarium oxysporum* on the yield will be excluded in this way. The influence of the product on the crop and yield will be clear.

Test crops

- tulip
- gladiolus
- lily

Of all flower bulb/ flower tuber crops these test crops are most susceptible for phytotoxicity. Compared to gladiolus, tulip and lily are more susceptible for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

It is not possible to extrapolate from one test crop to other crops. Extrapolation to all other flower bulb- and flower tuber crops and bulb flowers is possible when trials are conducted in tulip and lily and gladiolus. When trials are conducted in these test crops, extrapolation is possible to all flower bulb- and flower tuber crops respectively bulb flowers (forcing culture) in which *Fusarium oxysporum* occurs, except narcissus. The bulbs of narcissus are treated with warm water. The performance of the product can be influenced by this treatment. To claim this crop, trials are needed in narcissus.

Extrapolation from unprotected culture to the forcing culture is not possible. Extrapolation from forcing culture to unprotected culture of bulb- and flower tuber crops is possible when there are no yield trials of open field culture are necessary. Bulb flowers (forcing culture) are more susceptible for phytotoxicity in comparison to the unprotected culture of flower bulb- and flower tuber crops.

3.4 Pythium

Reference of the extrapolation is:
a) treatment of the soil in unprotected culture
b) treatment of the soil or substrate treatment in the forcing culture

3.4.1 Efficacy

Test organism

- Pythium root rot — - *Pythium* spp.

Test crop

Unprotected culture:
- crocus or iris
and
- hyacinth

Pythium is a very important disease in crocus and iris. Crocus and iris are relevant test crops for that reason. The duration of the efficacy of the products is important in the control of *Pythium*. The duration of the culture varies in length of crops planted in autumn. Hyacinth has a long duration of the culture (longer compared to crocus or iris). For that reason hyacinth is a good test crop for testing the duration of efficacy of the product. When trials are conducted in crocus or iris and hyacinth, the extrapolation can expand as wide as possible.
Pythium occurs in the unprotected culture of crocus, hyacinth and iris but not in other crops.

Forcing culture:
- tulip

Tulip is most susceptible for the disease.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Pythium* spp	- *Pythium* spp in all flower bulb- and flower tuber crops and bulb flowers

b) crops

Unprotected production:

From:	To:
- crocus	- iris and vice versa

No extrapolation is possible from hyacinth to other crops. Extrapolation is possible to all other flower bulb- and flower tuber crops and bulb flowers where *Pythium* occurs, when trials are conducted in crocus or lily and hyacinth.

Forcing culture:

From:	To:
- tulip	- iris and lily

Extrapolation is possible when the efficacy duration of the product is known. The duration of the forcing culture of tulip is five weeks. For iris and lily it takes eight to nine weeks. Good efficacy in tulip does not imply good efficacy in iris and lily when the efficacy duration of the product is not known. In such case it is necessary to conduct extra trials in iris or lily. Extrapolation is possible between both crops.

Extrapolation from unprotected culture to the forcing culture or the other way around is not possible.

3.4.2 Phytotoxicity

In both unprotected culture and forcing culture, phytotoxicity can be observed in the efficacy trials.
If needed, the influence of the product on the yield of unprotected cultures can be observed in phytotoxicity trials, on parcels, which are not susceptible for *Pythium*. The influence of *Pythium* on the yield will be excluded in this way. The influence of the product on the crop and on the yield will be clear.

Test crops

Unprotected production:
- crocus
- hyacinth

Forcing culture:
- tulip

Hyacinth is most susceptible for phytotoxicity. The crop is beside a relevant test crop for the duration of the product, a relevant test crop for phytotoxicity. Iris is less susceptible for phytotoxicity and for that reason not a proper test crop for determination of phytotoxicity.
In the forcing culture of tulip, iris and lily, root rot can appear. Tulip is the recommended test crop for efficacy, but only when the efficacy duration of the product is known. Tulip is the most susceptible crop for phytotoxicity, followed by lily. Iris is less susceptible for phytotoxicity.
In the case of a soil- or substrate treatment can, in contradistinction to bulb treatment, be confined with trials in tulip.

POSSIBILITIES OF EXTRAPOLATION

Unprotected production:

From:	To:
- crocus	- iris
- hyacinth	- all flower bulb- and flower tuber crops and bulb flowers in which *Pythium* occurs

Forcing culture:

From:	To:
- tulip	- iris and lily

Extrapolation from unprotected production to the forcing culture or the other way around is not possible. Extrapolation is possible from substrate treatment to soil treatment in the forcing culture. Vice versa this is not possible.

3.5 Rhizoctonia spp

Reference of the extrapolation is an infestation from the soil in the unprotected production and the possibilities of extrapolation to the forcing culture.

3.5.1 Efficacy

Test organism

- gray bulb rot	- *Rhizoctonia tuliparum*
- Rhizoctonia disease	- *Rhizoctonia solani*

Gray bulb rot can only be controlled with a soil treatment. In case of heavy infection, rhizoctonia disease in unprotected production and in forcing cultures can only be controlled with a soil treatment. In case of low infection, rhizoctonia disease can be controlled with a dip treatment of the bulbs or tubers.

Test crop

- tulip, unprotected production (gray bulb rot)
- lily, unprotected production (Rhizoctonia disease)

Tulip is a suitable test crop for gray bulb rot. While the fungus develops by low temperatures, plants will fall off. In the forcing cultures gray bulb rot hardly ever appears.
Lily is a suitable test crop for Rhizoctonia disease. While the fungus develops by high temperatures, plants will fall off. The quality of the flowers in the forcing culture is influenced negatively by Rhizoctonia disease.
In case of a low infection pressure of Rhizoctonia disease, a small number or no plants will fall off. The quality of the bulb/tuber will be influenced.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Soil treatment

From:	To:
- gray bulb rot	- Gray bulb rot and Rhizoctonia disease in all flower bulb- and flower tuber crops in unprotected production (production culture)
- Rhizoctonia disease	- Rhizoctonia disease* in all flower bulb- and flower tuber crops in unprotected culture (production) and to Rhizoctonia disease in the forcing culture in unprotected culture**

* Extrapolation from Rhizoctonia disease to gray bulb rot is not possible.
** Extrapolation to the protected forcing culture is not possible. A substrate with high humus content is used in these cultures.

Dip treatment

From:	To:
- Rhizoctonia disease	- Rhizoctonia disease in all flower bulb- and flower tuber crops in unprotected production (production culture)

Extrapolation from soil treatment to drip treatment and vice versa is not possible.

b) crops

From:	To:
- tulip (production culture)	- all other production cultures (unprotected) of flower bulb- and flower tuber crops and bulb flowers and forcing cultures (unprotected) of all flower bulbs and flower tuber crops
- lily (production culture)	- all other production cultures (unprotected) of flower bulb- and flower tuber crops and forcing cultures (unprotected) of all flower bulbs and flower tuber crops

Extrapolation from forcing culture to production culture is not possible because of the shorter duration of the culture.

3.5.2 Phytotoxicity

Phytotoxicity can be observed in the efficacy trials.
In case a soil treatment as well as a dip treatment is claimed, trials should be conducted on both ways of application. Extrapolation from production culture to forcing culture is not possible because of the shorter duration of the culture.
If needed, the influence of the product on the yield can be observed in phytotoxicity trials, on parcels, which are not susceptible for *Rhizoctonia* spp. The influence of *Rhizoctonia* spp on the yield will be excluded in this way. The influence of the product on the crop and on the yield will be clear.

Test crops

- tulip
- lily
- gladiolus

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- tulip, lily and gladiolus	- all other flower bulb- and flower tuber crops

3.6 Aphids (virus transmission)

Reference of the extrapolation is the treatment of a crop in unprotected cultures.

3.6.1 Efficacy

Test organism

- Lily symptomless virus (LSV)
- Tulip breaking virus (TBV)

Both viruses appear in lily.

Test crop
- lily

Because the crop is on the field in the summer, lily is most susceptible for infestation. In summer aphids, which are the vector for virus transmission, are most active.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Remark: the most important goal of controlling aphids in flower bulbs- and flower tuber crops is to prevent transmission of non-persistent viruses. Several aphid species can transmit the virus. The efficacy of the product is observed on the degree of virus transmission that is prevented.
The non-persistent viruses are the actual pest organisms. LSV and mosaic viruses are important viruses.

From:	To:
- Lily symptomless virus (LSV) - Tulip breaking virus	- LSV in other flower bulbs- and flower tuber crops - Mosaic viruses in other flower bulbs- and flower tuber crops

When a product shows a good control of both LSV-virus and mosaic viruses, extrapolation to remaining non-persistent viruses is possible.

b) crops

From:	To:
- lily	- all flower bulbs- and flower tuber crops and bulb flowers

3.6.2 Phytotoxicity

Phytotoxicity in lily can be observed in the efficacy trials.

Test crops

- lily
- tulip
- gladiolus

The control of aphids to prevent transmission of non-persistent viruses takes frequently place in lily, tulip and gladiolus. Tulip is susceptible for phytotoxicity. When tulip is claimed, phytotoxicity trials should be conducted in tulip.

POSSIBILITIES OF EXTRAPOLATION

Extrapolation from one test crop to other crops is not possible. Extrapolation to all other flower bulb- and flower tuber crops and bulb flowers where nonpersistent viruses occur, is possible when trials are conducted in tulip, lily and gladiolus and no phytotoxicity was found.

3.7 Aphids (sucking damage)

Reference of the extrapolation is the treatment of a crop.

3.7.1 Efficacy

Test organism

- melon or cotton aphid - *Aphis gossypii*

This aphis species, which appears frequently in flower bulb- and flower tuber crops, is hard to control.

Test crop

- lily
This crop is susceptible for infestation of aphids.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- cotton aphid	- other aphid species which can be found on flower bulbs-, flower tuber crops and bulb flowers

The cotton aphid appears frequently and is hard to control. Experiences prove that if cotton aphid is controlled well, other aphid species will be controlled also.

b) crops

From:	To:
- lily	- all flower bulbs- and flower tuber crops and bulb flowers

3.7.2 Phytotoxicity

Test crops

- lily
- tulip
- gladiolus

Phytotoxicity in lily can be observed in the efficacy trials.

Infestation with aphis can appear in a large range of flower bulb- and flower tuber crops and bulb flowers. Tulip and gladiolus are susceptible for phytotoxicity. In case control of aphids in all flower bulb- and flower tuber crops and bulb flowers is claimed, phytotoxicity trials need to be conducted in tulip and gladiolus.

POSSIBILITIES OF EXTRAPOLATION

Extrapolation from one test crop to other crops is not possible. Extrapolation to all other flower bulb- and flower tuber crops and bulb flowers where sucking damage caused by aphids occur, is possible when trials are conducted in tulip, lily and gladiolus.

3.8 Mites, bulb mite and curl bulb mite

Reference of the extrapolation is the treatment of flower bulbs or flower tubers.

3.8.1 Efficacy

Test organism

- bulb mite	- *Rhizoglyphus echinopus*, *R.robini*
- curl mite	- *Eriophyes tulipae*

Test crop

- lily	(bulb mite)
- tulip	(curl bulb mite)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- bulb mite	- bulb mite in all flower bulb- and flower tuber crops and bulb flowers
- curl mite	- curl mite in all flower bulb- and flower tuber crops and bulb flowers

Extrapolation from bulb mite to curl mite and vice versa is not possible.

b) crops

From:	To:
- cily	- all flower bulb- and flower tuber crops and bulb flowers in which bulb mite occurs
- tulip	- all flower bulb- and flower tuber crops and bulb flowers in which curl mite occurs

Extrapolation to all flower bulb- and flower tuber crops and bulb flowers in which bulb mite and/or curl mite occur, is possible when trials are conducted in lily and tulip.

3.8.2 Phytotoxicity

Phytotoxicity can be observed in the efficacy tests.

Test crops

- lily
- tulip
- gladiolus

POSSIBILITIES OF EXTRAPOLATION

Extrapolation from one test crop to other crops is not possible. Extrapolation to all other flower bulb- and flower tuber crops and bulb flowers in which bulb mite and/or curl mite occur, is possible when trials are conducted in lily, tulip and gladiolus.

3.9 Weeds

3.9.1 Efficacy

Test organism

- annual grasses	e.g. annual meadow-grass
- volunteers of cereals	e.g. wheat, barley (covering with straw)
- annual dicotyledonous	e.g. common groundsel, lambsquaters etc.
- perennial grasses	e.g. couchgrass
- perennial dicotyledonous	e.g. creeping yellowcress

The weed species mentioned above are common in the culture of flower bulb- and bulb flower. Beside the mentioned species, other weed species are suitable also.

Test crop

Spring flowering crops
- tulip or
- narcissus
- hyacinth

Summer- and autumn flowering crops
- lily or
- gladiolus

Only unprotected cultures of the crops mentioned above are suitable test crops.

POSSIBILITIES OF EXTRAPOLATION

a) weeds

From:	To:
- specific weed species in a crop	- the same weed species in other crops

b) crops

From:	To:
- unprotected culture of tulip, narcissus or hyacinth	- unprotected and protected cultures of other spring flowering flower bulb- and bulb flower crops
- unprotected culture of lily or gladiolus	- unprotected and protected cultures of other summer flowering flower bulb- and bulb flower crops
- protected culture of bulb flowers in trays or containers (contact herbicide)	- protected soil bound culture of bulb flowers (contact herbicide)
- protected soil bound culture of bulb flowers (contact herbicide)	- protected culture of bulb flowers in trays or containers (contact herbicide)
- unprotected culture of flower bulb culture	- unprotected soil bound culture of bulb flower culture
- unprotected culture of bulb flower culture	- unprotected soil bound culture of flower bulb culture

Extrapolation from one weed species to other weed species is not possible, because of the differences of sensitivity of the weed species for a specific herbicide.

Extrapolation from protected soil bound culture of bulb flower to unprotected soil bound culture of flower bulb- and bulb flower is not possible. Weeds in unprotected cultures are more hardened off and for that reason less susceptible for herbicides.

Only in a view cases the control of weeds in the culture of bulb flowers in trays or containers is necessary. For the working of soil herbicides extrapolation from the protected culture of bulb flowers in trays or containers to the protected soil bound culture of bulb flowers is not possible. Extrapolation from the protected soil bound culture of bulb flowers to the protected culture of bulb flowers in trays or containers is not possible either. Extrapolation is not possible because there are differences between the soil type in trays or containers and the soil type in the open field.

3.9.2 Phytotoxicity

Test crops

From:	To:
- tulip, narcissus, hyacinth (spring flowering crops) **and** lily, gladiolus (summer flowering crops)	- other flower bulb- and bulb flower crops
- protected soil bound culture of bulb flowers	- unprotected soil bound culture of bulb flower
- unprotected soil bound culture of flower bulbs	- unprotected soil bound culture of bulb flower

Within the group of flower bulbs and bulb flowers extrapolation from one crop to another crop is not possible. When however there is no phytotoxicity found in the mentioned test crops, extrapolation is possible to the group of flower bulbs and bulb flowers.

Extrapolation from bulb flower culture to flower bulb culture is not possible. In comparison with the flower bulb culture other parameters are in force in the bulb flower culture. In the trials conducted in bulb flowers no yield assessments of bulbs/ tubers are conducted.

Extrapolation from the protected soil bound culture of bulb flowers to the protected culture of bulb flowers in trays or containers is not possible.

4 Floriculture

4.1 Nematodes in floriculture

Reference of the extrapolation is the treatment of a crop in unprotected cultures.

4.1.1 Efficacy

Test organism

- root-lesion nematodes	- *Pratylenchus* spp.
- burrowing nematodes	- *Radopholus similis*
- root-knot nematodes	- *Meloidogyne* spp.
- foliar nematodes	- *Aphelenchoides* spp.

The stem nematode (*Ditylenchus dipsaci)* and the lemon-shaped cyst nematodes (*Heterodera* spp.) are not important in these crops.

Test crop

- rose or chrysanthemum	(root-lesion nematodes)
- *Anthurium andreanum*	(burrowing nematodes)
- *Bouvardia*	(root-knot nematodes)
- *Nephrolepis* and chrysanthemum	(foliar nematodes)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- root-lesion nematodes	root-lesion nematodes and burrowing nematodes
- burrowing nematodes	burrowing nematodes and root-lesion nematodes
- root-knot nematodes	root-knot nematodes
- foliar nematodes	foliar nematodes

b) Crops

From:	To:
- rose or chrysanthemum *)	protected culture of other floriculture crops, protected culture of bulbflowers (cut flower production), in which root-lesion nematodes and burrowing nematodes can be found
- *Anthurium andreanum *)*	protected culture of other floriculture crops, protected culture of bulbflowers (cut flower production), in which root-lesion nematodes and burrowing nematodes can be found
- *Bouvardia*)*	protected culture of other floriculture crops, protected culture of bulbflowers (cut flower production), in which root-knot nematodes can be found
- *Nephrolepis* and chrysanthemum **)	protected culture of other floriculture crops, protected culture of bulbflowers (cut flower production), in which foliar nematodes can be found

*) For this extrapolation it is necessary that the substrate and the growing system of the tested crops and the other crops are the same. There are no possibilities of extrapolation between the different kinds of substrate. This is not possible because the substrate has a big influence on the efficacy of pesticides (e.g. pesticides on artificial substrate are more effective compared to soil production).

**) To make the extrapolation to other crops possible, it is necessary that both crops should be tested. The structure of the leaves (smooth and fatty of *Nephrolepis* or soft and hairy of chrysanthemum) and a layer of wax on the leaves are of big influence on the efficacy of the pesticides (absorption in the leaves).

4.1.2 Phytotoxicity

The research should be conducted under protected conditions.

Test crops

Cut flowers	Potted plants
- *Lisianthus (Eustoma)*	*Fuchsia*
- rose	*Begonia*
- *Dendranthema* (chrysanthemum)	*Ficus benjamina*
- *Gerbera*	*Saintpaulia*
- carnation	*Exacum*
- common chalkplant	*cyclamen*

A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower and as a potted plant. These crops do not always differ in sensibility for pesticides and data of phytotoxicity of one of these crops is sufficient. It is possible to extrapolate between cut flowers and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- if the results of the trails of the test crops (at least three species of cut flowers and three species of potted plants) are satisfactory	- other floricultural crops, nursery crops and perennials. Extrapolation is possible to protected and unprotected production

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected culture to unprotected culture is possible because unprotected cultures are less sensitive for phytotoxicity.
Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to the protected culture of floriculture crops.

4.2 Grey mould

Reference of the extrapolation is the treatment of a crop.
The research should be conducted under protected conditions.

4.2.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckeliana*

Test crop

protected culture of cut flowers	protected culture of potted plants
- *Lisianthus (Eustoma)* or	*Pelargonium* or
- rose or	*Begonia* or
- *Dendranthema* (chrysanthemum) or	*Cyclamen* or
- *Gerbera*	*Saintpaulia* or
	Exacum affine

The crops mentioned are important floriculture crops that are sensitive for grey mould.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

There are no possibilities for extrapolation.

b) Crops

From:	To:
- protected culture of one cut flower **and** protected culture of one potted plant	- all protected and unprotected floriculture crops
	- tree nursery crops and perennials, protected breeding and seed production of arable and vegetable crops

If on two of the above mentioned test crops
Extrapolation to all protected and unprotected floriculture crops is possible when trials are conducted in two of the above mentioned test crops (protected culture); i.e. protected culture of one cut flower **and** protected culture of one potted plant.

4.2.2 Phytotoxicity

The research should be conducted under protected conditions.

Test crops

Cut flowers	Potted plants
- *Lisianthus (Eustoma)*	*Fuchsia*
- rose	*Begonia*

- *Dendranthema* (chrysanthemum)	*Ficus benjamina*
- *Gerbera*	*Saintpaulia*
- carnation	*Exacum*
- common chalkplant	*cyclamen*

These crops are sensitive for phytotoxicity and representatives for cut flowers or potted plants. When there is a difference between cultivars in sensibility for phytotoxicity, a sensitive cultivar has to be chosen.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flowers and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials. - breeding and seed growing of arable and vegetable crops (protected culture)

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of floriculture crops is possible because unprotected cultures are less sensitive for phytotoxicity.
Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding culture. So it is necessary to research the influence of the product on the germinal force of the seed.
Research is not necessary if there is a lot of (practical) experience that the product has no influence on the germination force of the seed.

4.3 Diseases of germinating plants/ root rot/ foot rot

Reference of the extrapolation is the treatment of the soil or a treatment by pouring.
The research should be conducted under protected conditions.

4.3.1 Efficacy

Diseases of germinating plants, root rot and foot rot are mainly caused by *Pythium* spp., *Phytophthora* and *Rhizoctonia*. Also *Chalara* and *Fusarium* spp. can cause diseases of germinating plants. One can speak of diseases of germinating plants if these diseases occur in the stadium that the cotyledons are completely unfolded. One can speak of root rot if these diseases occur in a later growth stage.

Test organism

- *Pythium* spp. **and**
- *Rhizoctonia* spp. **and**
- *Phytophthora* spp.

Test crops

- protected culture of Carnation or C*hrysanthemum morifolium*	*Pythium* spp.
- protected culture of *Saintpaulia, Begonia* or *Kalanchoe*	*Rhizoctonia* spp.
- protected culture of *Saintpaulia* or *Gloxinia*	*Phytophthora* spp., *Pythium* spp.

The crops mentioned above are important floriculture crops and sensitive for this disease.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Pythium* spp.	all *Pythium* spp.
- *Rhizoctonia* spp.	all *Rhizoctonia* spp.
- *Phytophthora* spp.	all *Phytophthora* spp.

Pythium, Phytophthora and Rhizoctonia cause the main diseases of germinating plants and root rot. Extrapolation is possible to all other diseases that can infect germinating plants and roots if the efficacy against the test organism is sufficient and consistent.

b) Crops

From:	To:
- Carnation or *Chrysanthemum morifolium*	- protected and unprotected culture of other cut flowers
- *Saintpaulia, Begonia* or *Kalanchoe* or *Gloxinia*	- protected and unprotected culture of other potted plants

Extrapolation is possible to all protected and unprotected produced floriculture crops when research is done in Carnation or C*hrysanthemum morifolium, Saintpaulia, Begonia, Kalanchoe* or *Gloxinia.*

4.3.2 Phytotoxicity

The research should be conducted under protected conditions.

Test crops

cut flowers	potted plants
- *Lisianthus (Eustoma)*	*Fuchsia*
- rose	*Begonia*
- *Dendranthema* (chrysanthemum)	*Ficus benjamina*
- *Gerbera*	*Saintpaulia*
- carnation	*Exacum*
- common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.
Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.

4.4 Mildew, powdery mildew

The extrapolation has reference to a treatment of the crop.
The research should be conducted under protected conditions.

4.4.1 Efficacy

Test organism

- *Sphaerotheca pannosa* **and**
- *Microsphaera begoniae* **and**
- *Oïdium* spp.

Test crop

- rose (cut flower)	- *Sphaerotheca pannosa*
- *Begonia*	- *Microsphaera begoniae*
- *Saintpaulia* or potted chrysanthemum	- *Oïdium* spp.

The crops mentioned are important floriculture crops that are sensitive for powdery mildew.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- *Sphaerotheca pannosa*	- *Sphaerotheca pannosa*
- *Microsphaera begoniae*	- *Microsphaera begoniae*
- *Oïdium* spp.	- *Oïdium* spp.

When efficacy against the three mildew species mentioned above is good en consistent, extrapolation is possible to all species of Powdery Mildew.

b) Crops

From:	To:
- rose (cut flower)	protected and unprotected production of other cut flowers where *Sphaerotheca* spp. can be found
- *Begonia (*potted plant)	protected and unprotected production of other potted plants where *Microsphaera* spp. can be found
- *Saintpaulia* (potted plant)	protected and unprotected production of other potted plants where *Oïdium* spp. can be found

When research is done in rose, *Saintpaulia* and *Begonia* extrapolation is possible to all protected and unprotected produced floriculture crops.
For *Sphaerotheca* spp. it is possible to extrapolate from rootstock of rose and oak to protected and unprotected produced cut flowers and potted plants where *Sphaerotheca* spp. can be found.

4.4.2 Phytotoxicity

The research should be conducted under protected conditions.

Test crops

cut flowers	potted plants
- *Lisianthus (Eustoma)*	*Fuchsia*
- rose	*Begonia*
- *Dendranthema* (chrysanthemum)	*Ficus benjamina*
- *Gerbera*	*Saintpaulia*
- carnation	*Exacum*
- common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.

4.5 Mildew, downy mildew

The extrapolation has reference to a treatment of the crop.
The research should be conducted under protected conditions.

4.5.1 Efficacy

Test organism

- *Peronospora chlorae*
- *Pseudoperonospora sparsa*

Test crop

- lisianthus *(Eustoma russellianum)*	*Peronospora chlorae*
- rose	*Pseudoperonospora sparsa*

The crops mentioned are important floriculture crops and are sensitive for downy mildew.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Peronospora chlorae*	- *Peronospora* spp.
- *Pseudoperonospora sparsa*	- *Pseudoperonospora* spp.

When efficacy against the two mildew species mentioned is good and consistent, extrapolation is possible to all species of downy mildew.

b) crops

From:	To:
- lisianthus *(Eustoma russellianum)*	protected and unprotected culture of other cut flowers in which *Peronospora* spp. can be found
- rose	protected and unprotected culture of other cut flowers in which *Pseudoperonospora* spp. can be found

When research is done in Rose and lisianthus extrapolation is possible to all protected and unprotected produced floriculture crops.

4.5.2 Phytotoxicity

The research should be conducted in protected culture.

Test crops

cut flowers	potted plants
- lisianthus *(Eustoma)*	*Fuchsia*
- rose	*Begonia*
- *Dendranthema* (chrysanthemum)	*Ficus benjamina*
- *Gerbera*	*Saintpaulia*
- carnation	*Exacum*
- common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.

4.6 *Phytophthora*

Reference of the extrapolation is the treatment of the soil or a treatment by pouring.
The research should be conducted under protected conditions.

4.6.1 Efficacy

A lot of *Phytophthora* spp. can be found in the culture of floriculture crops. The mean species are *P. nicotianae, P. cryptogea, P. capsici* and *P. cactorum.*

Test organism

- *Phytophthora nicotianae*
- *Phytophthora capsici*
- *Phytophthora cryptogea*
- *Phytophthora cactorum*

Test crop

- *Saintpaulia* or rose	- *Phytophthora nicotianae*
- *Cyclamen*	- *Phytophthora capsici, Phytophthora cactorum* or *Phytophthora nicotianae*
- *Gerbera*	- *Phytophthora cryptogea*

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- *Phytophthora nicotianae*	- *Phytophthora nicotianae*
- *Phytophthora capsici*	- *Phytophthora capsici*
- *Phytophthora cryptogea*	- *Phytophthora cryptogea*
- *Phytophthora cactorum*	- *Phytophthora cactorum*

When efficacy against the four *Phytophthora* species mentioned is good en consistent extrapolation is possible to *Phytophthora* spp.

b) crops

From:	To:
- *Saintpaulia* or rose **and**	- protected culture of other floriculture crops
- *Cyclamen* **and**	
- *Gerbera*	

4.6.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

Cut flowers	Potted plants

lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.

4.7 Rusts

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.7.1 Efficacy

Test organism

- white rust	*Puccinia horiana*
- rust	*Uromyces dianthi*

Test crop

- protected culture of *Chrysanthemum morifolium*	*Puccinia horiana*
- protected culture of *Dianthus caryophyllus*	*Uromyces dianthi*

The crops mentioned are important floriculture crops that are sensitive for rusts.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Puccinia horiana*	- *Puccinia* spp.
- *Uromyces dianthi*	- *Uromyces* spp.

b) crops

From:	To:
- *Chrysanthemum morifolium*	other cut flowers (protected and unprotected) in which *Puccinia* spp. can be found
- *Dianthus caryophyllus*	other cut flowers (protected and unprotected) in which *Uromyces* spp. can be found

4.7.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

Cut flowers	Potted plants
lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.
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4.8 Aphids

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.8.1 Efficacy

A lot of aphids can be found in the protected culture of floriculture crops. Most species are polyphagous. The Cotton aphid (*Aphis gossypii*), green peach aphid (*Myzus persicae),* black bean aphid (*Aphis fabae),* potato aphid (*Macrosiphum euphorbiae),* rose aphid (*Macrosiphum rosae)*, shallot aphid (*Myzus ascalonicus),* leaf curl plum aphid (*Brachycaudus helichrysi),* foxglove aphid (*Aulacorthum solani)* and yellow rose aphid (*Rhodobium porosum)* are the most important species in the protected culture of floriculture crops.

Test organism

- cotton aphid	*Aphis gossypii*
- green peach aphid	*Myzus persicae*
- black bean aphid	*Aphis fabae*
- potato aphid	*Macrosiphum euphorbia*
- rose aphid	*Macrosiphum rosae*
- shallot aphid	*Myzus ascalonicus*
- leaf curl plum aphid	*Brachycaudus helichrysi*

Stage
Larvae and adults

Test crop

Chrysanthemum morifolium (cut flower or potted plant) **or**
Hibiscus **or**
rose (cut flower or potted plant)

The crops mentioned are important floriculture crops that are sensitive for aphids.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- one aphid species	- same species in other crops
- cotton aphid + two other species of test organisms	- all aphids that can be found in floriculture crops. Extrapolation is not possible to mealy cabbage aphid in breeding and seed growing of cabbage crops

Extrapolation is possible because cotton aphid is the most difficult to control aphid of the species mentioned above. To make this extrapolation possible it should be proved that the product also controls leaf-curling aphids like black bean aphid. This can be proved by research or by characterisation of the product (systemic or non-systemic).

When the product controls cotton aphid and two other aphids well, extrapolation is possible to all other aphids that can be found in these crops.

b) Crops

From:	To:
- test crops	- protected culture of other floriculture crops - protected culture of breeding and seed growing of arable crops and vegetables

Extrapolation is not possible to unprotected productions, because:
- the climate conditions are totally different between protected cultures and unprotected cultures
- the cultures are not always comparable
- the infestation in the field is often higher (with the exception of cotton aphid)
Extrapolation is possible from cotton aphid in protected cultures to unprotected cultures, because cotton aphid is hardly seen outdoors.

4.8.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

cut flowers	potted plants
lisianthus *(Eustoma)*	*Begonia*
rose	*Fuchsia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials. - breeding and seed growing of arable and vegetable crops (protected culture)

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity than protected floriculture crops.

It is of great importance that the application of a product does not influence the germinal force of the seed of the breeding and the culture of seed growing. Extrapolation is not possible from a corresponding culture of products. There will be needed separate research to judge the influence of the product on the germinal force of the seed.
If it is known from experience that the product does not influence the germinal force of the seed research is not necessary.

4.9 Leaf miners

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.9.1 Efficacy

Test organism

- American serpentine leaf miner - *Liriomyza trifolii*

Stage
Larvae

Test crop

- *Gerbera* **or**
- common chalkplant **or**
- *Dendranthema (*chrysanthemum)

Matthiola is not a suitable test crop. Leaf miner in *Matthiola* is *Scaptomyza flaveola* and this specie will not be found in other cut flowers of potted plants. No possibilities for extrapolation are known from or to this species.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
American serpentine leaf miner	American serpentine leaf miner, tomato leaf miner and South American leaf miner and chrysanthemum leaf miner

In floriculture crops most important species are *L. bryoniae, L. trifolii, L. huidobrensis* and *Chromatomyia syngenesiae* (chrysanthemum leaf miner).
L. bryoniae and *Chromatomyia syngenesiae* can be less frequently found and can be easier controlled than the other two leaf miners mentioned. So *L. bryoniae* is not suitable for extrapolation to other *Liriomyza* spp..
It is possible to extrapolate from *L. trifolii* to other *Liriomyza* spp. and *Chromatomyia syngenesiae* because this leaf miner can be frequently found and is hard to control.

b) crops

From:	To:
-*Gerbera* or common chalkplant or *Dendranthema*	- other floriculture crops, nursery crops and perennials. Extrapolation is possible to protected and unprotected production

4.9.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

cut flowers	potted plants
lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.

4.10 Caterpillars (Spodoptera exigua and Chrysodeixis chalcites)

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.10.1 Efficacy

Test organism

- beet army worm	*Spodoptera exigua*
- tomato looper	*Chrysodeixis chalcites*

Stage

Caterpillars

Test crop

- rose **or**
- *Dendranthema* (*Chrysanthemum morifolium)*

The crops mentioned are important floriculture crops that are sensitive for caterpillars mentioned.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- beet army worm	- protected culture of breeding and seed growing of arable and vegetable crops
- tomato looper	protected culture of breeding and seed growing of arable and vegetable crops

Only extrapolation of *Spodoptera exigua* and *Chrysodeixis chalcites* is mentioned.
The reason for that is:
- at the Plant Protection Service (NVWA) only about these caterpillars is knowledge available
- caterpillars are not always polyphagous

b) crops

From:	To:
- rose or *Dendranthema (Chrysanthemum morifolium)*	protected culture off other floriculture and vegetable crops in which the beet army worm and tomato looper can be found

Extrapolation is not possible to unprotected cultures, because no expertise exists on this subject.
Outdoors beet armyworm and tomato looper can only be found in warm summers and in the vicinity of greenhouses.
In the Netherlands these caterpillars cannot survive the wintertime.

4.10.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

cut flowers	potted plants
lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when no phytotoxicity has been found. Extrapolation from protected to unprotected production of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected floriculture crops.

4.11 Thrips

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.11.1 Efficacy

In floriculture crops under protected conditions onion thrips, western flower thrips and *Echinothrips americanus* can be found.

Test organism

- western flower thrips	*Frankliniella occidentalis*
- *Echinothrips americanus*	*Echinothrips americanus*

Stage

larvae and adults

Test crop

- *Dendranthema (Chrysanthemum morifolium)* or *Saintpaulia*	western flower thrips
- *Spathiphyllum* or *Dieffenbachia*	*Echinothrips americanus*

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- western flower thrips	western flower thrips and onion thrips (*Thrips tabaci*)
- *Echinothrips americanus*	*Echinothrips americanus*

The thrips mentioned above are most important in floriculture crops. *F. occidentalis* has a hidden lifestyle and therefore hard to control.
If *F. occidentalis* can be well controlled, extrapolation is possible to onion thrips.
Extrapolation is only possible if the research is done in a crop in which the thrips is hidden. Therefore *Dendranthema* and *Saintpaulia* are suitable test crops because thrips is hidden in the flower. That is why *Impatiens* is not a suitable test crop.

E. americanus lives his entire life on the leaves and is as far as we known now less susceptible for pesticides. Therefore separate information of this trips is needed. *Echinothrips* is most common species of the family of *Araceae.*

b) crops

From:	To:
-*Dendranthema* or *Saintpaulia*	- Western flower trips in protected culture of other floriculture crops, nursery crops and perennials

	- protective culture of breeding and seed growing of arable and vegetables crops
- *Spathiphyllum* or *Dieffenbachia*	- *Echinothrips* in other floriculture crops, nursery crops and perennials under protected conditions - breeding and seed growing of arable and vegetables crops under protected conditions
and	
- *Spathiphyllum* or *Dieffenbachia*	- *Echinothrips* in protected culture of other floriculture crops, nursery crops and perennials - protected culture oof breeding and seed growing of arable and vegetables crops

Extrapolation is not possible to unprotected cultures because climate conditions and culture conditions are not always comparable.

4.11.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

cut flowers	potted plants
lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Ficus benjamina is known as extremely susceptibility for pesticides.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials. - breeding and seed growing of arable and vegetable crops (protected culture)

Extrapolation is only possible when no phytotoxicity is found. Extrapolation is possible to unprotected cultures of these crops because these cultures are less sensitive for phytotoxicity than these crops grown under protected conditions.
Extrapolation is possible to nursery crops and perennials because in general these crops are less sensitive for phytotoxicity compared to culture of floriculture crops grown under protected conditions.

It is of great importance that the application of a product does not influence the germinal force of the seed of the breeding and the culture of seed growing. Extrapolation is not possible from the corresponding culture of products. There will be needed separate research to judge the influence of the product on the germinal force of the seed.
If it is known from experience that the product does not influence the germinal force of the seed research is not necessary.

4.12 Whitefly

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.12.1 Efficacy

In the protected culture of floriculture crops silverleaf whitefly and glasshouse whitefly can be found.

Test organism

- silverleaf whitefly — *Bemisia argentifolii*

Stage

Larvae and adults

Test crop

- *Poinsettia* **or** *Gerbera*

The crops mentioned are important floriculture crops that are sensitive for whitefly.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- silverleaf whitefly	- silverleaf whitefly and glasshouse whitefly (*Trialeurodes vaporariorum)*

Extrapolation is possible from silverleaf whitefly to glasshouse whitefly because silverleaf whitefly is hard to control. Therefore proof should be given by a few trials that the product also controls glasshouse whitefly. The results should be good and consistent against both whiteflies.

b) crops

From:	To:
- *Poinsettia*	- other floriculture crops (protected and unprotected)
or	- protected culture of breeding and seed growing of arable and vegetables crops
- *Gerbera*	

Both silverleaf whitefly and glasshouse whitefly are not common outdoors. They could only be a problem in warm summers and in the neighbourhood of glasshouses. This means that the whiteflies are not in optimum condition and are better to control than in the glasshouses.
Extrapolation to unprotected cultures is possible if it is proved that glasshouse whitefly can be well controlled under protected conditions.

4.12.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

cut flowers	potted plants
lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials. - breeding and seed growing of arable and vegetable crops (protected culture)

Extrapolation is only possible when the research is done in protected culture and no phytotoxicity is found. Extrapolation is possible to unprotected cultures of these crops because these cultures are less sensitive for phytotoxicity than these crops grown under protected conditions.
Extrapolation is possible to nursery crops and perennials because in general these crops are less sensitive for phytotoxicity than the protected culture of floriculture crops.

It is of great importance that the application of a product does not influence the germinal force of the seed of the breeding and the culture of seed growing. Extrapolation is not possible from the corresponding culture of products. It is necessary to separate research to judge the influence of the product on the germinal force of the seed.
When there is some experience that the product does not influence the germinal force of the seed, research is not necessary.

4.13 Mealy bugs

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.13.1 Efficacy

Test organism

- citrus mealy bug	*Pseudococcus citri*
- grape mealy bug	*Pseudococcus maritimus*

Stage

Larvae and adults

Test crop

- *Ficus*
- *Kalanchoe*

The crops mentioned are important potted plants that are sensitive for mealy bugs.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

Extrapolation is not possible when the larvae mealy bug of one specie is controlled to mealy bugs that are situated in the wax mass, unless the characterisation of the product (systemically) makes extrapolation possible.

b) crops

From:	To:
- *Ficus*	other floriculture crops (protected culture)
- *Kalanchoe*	other floriculture crops (protected culture)

Extrapolation to field production is not under discussion because infestation of mealy bugs is hardly seen outdoors.

4.13.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

cut flowers	potted plants
lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*

Dendranthema (chrysanthemum)
Gerbera
carnation
common chalkplant
Hippeastrum
orchids
Ficus benjamina
Saintpaulia
Exacum
Cyclamen
Kalanchoe

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.
Test crops are also *Hippeastrum, Kalanchoe* and orchids because mealy bugs are hard to control in these crops.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials.

Extrapolation is only possible when the research is done in protected culture and no phytotoxicity has been found. Extrapolation from protected to unprotected cultures of these crops is possible because unprotected cultures are less sensitive for phytotoxicity.

Extrapolation to nursery crops and perennials is possible because in general these crops are less sensitive for phytotoxicity compared to protected cultures of floriculture crops.

4.14 Mites, spider mites

The extrapolation has reference to a treatment of the crop.
The research should be done under protected conditions.

4.14.1 Efficacy

Test organism

- two spotted spider mite — *Tetranychus urticae*

This spider mite is most common.

Stage

Larvae and adults

Test crop

cut flowers (protected culture)	potted plants (protected culture)
rose	*Ficus*
Dendranthema (chrysanthemum)	*Hibiscus*
carnation	*Hedera*

The crops mentioned are important floriculture crops that are sensitive for spider mites.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
two spotted spider mite	*Tetranychus* spp.

b) crops

From:	To:
- rose **or** - *Dendranthema* (chrysanthemum) **or** - carnation	other cut flowers
- *Ficus* **or** - *Hibiscus* **or** - *Hedera*	other potted plants

- cut flowers **and** potted plants	- protected and unprotected culture of floriculture crops - protected and unprotected culture of tree nursery crops, perennials and public green spaces. - fruit crops in which two spotted spider mite can be found - breeding and seed growing of arable and vegetable crops (protected culture)

Extrapolation to unprotected cultures is possible because the conditions under protected conditions for two-spotted spider mite are very good and the infestation will be high.

4.14.2 Phytotoxicity

The research should be done under protected conditions.

Test crops

cut flowers	potted plants
lisianthus *(Eustoma)*	*Fuchsia*
rose	*Begonia*
Dendranthema (chrysanthemum)	*Ficus benjamina*
Gerbera	*Saintpaulia*
carnation	*Exacum*
common chalkplant	*Cyclamen*

These crops are sensitive for phytotoxicity and are representatives for cut flowers or potted plants. A sensitive cultivar has to be chosen when there is a difference between cultivars in sensibility for phytotoxicity.

Several test crops can be grown as a cut flower or as a potted plant. It is not the intention that crops like rose or chrysanthemum will be tested as a cut flower *and* as a potted plant. While these crops not always differ in sensibility for pesticides, it is sufficient to deliver phytotoxicity data of one of these crops. It is possible to extrapolate between cut flower and potted plants of the same crop.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- at least three species of cut flowers (protected culture) **and** - at least three species of potted plants (protected culture)	- protected and unprotected culture of floriculture crops (including protected culture of bulb flowers for the production of cut flowers), tree nursery crops and perennials. - breeding and seed growing of arable and vegetable crops (protected culture)

Extrapolation is only possible when no phytotoxicity is found. Extrapolation is possible to unprotected cultures of floriculture, tree nursery crops and perennials because these crops are less sensitive for phytotoxicity than the same crops grown under protected conditions.
Extrapolation is possible to nursery crops and perennials because in general these crops are less sensitive for phytotoxicity compared to culture of floriculture crops grown under protected conditions.

It is of great importance that the application of a product does not influence the germinal force of the seed of the breeding and the culture of seed growing. Extrapolation is not possible from the corresponding culture of products. There will be needed separate research to judge the influence of the product on the germinal force of the seed.
If it is known from experience that the product does not influence the germinal force of the seed research is not necessary.

4.15 Weeds

4.15.1 Efficacy

Test organism

Group:	
- annual grasses	e.g. meadow grass
- annual dicotyledonous weeds	e.g. common groundsel, fat hen
- perennial grasses	e.g. quackgrass
- perennial dicotyledonous weeds	e.g. field cress

Weeds mentioned are common species in the culture of floriculture crops. Nevertheless other weed species can be suitable as a test weed.

Test crop

The claim of the company is the starting point for research. In the culture of cut flowers or potted plants the claim will often be very specific so claimed crops should be tested.
In other situations rose, chrysanthemum or carnation are major crops that are suitable as test crop.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- a specific weed specie in a crop	- the same weed specie in other crops
- application in unprotected culture	- application in protected soil bound cultures
- application in unprotected culture of contact acting herbicides	- application of contact acting herbicides in potted plants (protected and unprotected culture)

b) crops

From:	To:
- sowing crops of a certain species	- planted crop of the same species
- planted crops of a certain species	- sowing crops of the same species

Extrapolation is not possible from one crop of cut flowers or potted plants to another crop of cut flowers of potted plants.

Extrapolation is not possible from one weed specie to another weed specie because sensibility of weed species can be different.

Efficacy of products against weed species under protected conditions cannot be extrapolated to unprotected cultures. Weeds grown outdoors are usually stronger and therefore less sensitive for herbicides.

Efficacy of soil acting herbicides against weed species in the field cannot be extrapolated to the use in potted plants.

Efficacy of contact acting herbicides and soil acting herbicides cannot be extrapolated from use outdoors or use in potted plants to use in artificial substrate.

For efficacy there is no experience with the use of herbicides on artificial substrate.

4.15.2 Phytotoxicity

Test crops

From:	To:
- application in a certain crop (protected culture)	- application in the same crop (unprotected culture)

Extrapolation is not possible from one crop to another crop within the group of floriculture.

Phytotoxicity of both contact-acting herbicides as soil acting herbicides cannot be extrapolated from the application in unprotected cultures or in potted plants to the application on artificial substrate. For phytotoxicity there is no experience with the application of herbicides on artificial substrate.

5 Tree nursery crops and perennials

(unprotected culture)

5.1 General

Efficacy

The extrapolation in relation to efficacy are restricted to tree nursery crops and perennials in unprotected cultures.
Extrapolations in relation to tree nursery crops and perennials in protected cultures can be made from the protected culture of cut flowers and potted plants. This is possible with the exception of treatments with herbicides. For herbicides extrapolation is not possible because weeds in protected cultures are easier to control than weeds in unprotected cultures.

Phytotoxicity

The range of tree nursery crops is wide and the amount of cultivars is high. Therefore it is not possible to indicate crops that are very susceptible to phytotoxicity. This aspect should be judged in the efficacy trials to get an idea of the phytotoxic effects of the product.
For crop treatments with insecticides and fungicides this means that test crops used in efficacy trials can be used to judge the phytotoxicity. The possibility of phytotoxic reactions and also the consequences (also financially) by the use of herbicides is of largers extent compared to the use of insecticides and fungicides, therefore separate research on phytotoxicity is necessary for treatments with herbicides.

Phytotoxicity information is needed of at least of three tree nursery crops to claim the whole group of tree nursery crops. For perennials separate information is needed because these crops are herbaceous. It is also possible to extrapolate from the protected culture of cut flowers and potted plants to tree nursery crops and perennials (see protected culture of cut flowers and potted plants).
It is possible to extrapolate from tree nursery crops to public green spaces.
Extrapolation is possible from a treatment in apple and pear to the culture of rootstocks and fruit trees (see fruit crops).

If a treatment is claimed in both the protected and the unprotected culture, it is recommended to conduct the research in the protected culture, because in this situation extrapolation is possible to the unprotected culture.

5.2 Nematodes in tree nursery crops

The research should be done in unprotected culture.

5.2.1 Efficacy

Test organism

- root-lesion nematodes	*Pratylenchus penetrans*
- root-knot nematodes	*Meloidogyne* spp.
- foliar nematodes	*Aphelenchoides* spp.
- stem nematodes	*Ditylenchus dipsaci*

Test crop

- rose	(root-lesion nematodes)
- perennial (species is not important)	(root-knot nematodes)
- anemone **or** peony	(foliar nematodes)
- *Hosta* **or** *Phlox*	(stem nematodes)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Pratylenchus penetrans*	- root-lesion nematodes (*Pratylenchus* spp.)
- *Meloidogyne* spp.	- root-knot nematodes (*Meloidogyne* spp.)
- *Aphelenchoides* spp.	- foliar nematodes (*Aphelenchoides* spp.)
- *Ditylenchus dipsaci*	- stem nematodes (*Ditylenchus* spp.)

There are no possibilities of extrapolation between these four species of nematodes.

b) crops

From:	To:
- rose	- other tree nursery crops and perennials in which root-lesion nematodes can be found
- perennial (species is not important)	- other tree nursery crops and perennials in which root-knot nematodes can be found
- anemone **or** peony	- other tree nursery crops and perennials in which leaf nematodes can be found
- *Hosta* **or** *Phlox*	- other tree nursery crops and perennials in which stem nematodes can be found

Concerning *Ditylenchus* spp. and *Aphelenchoides* extrapolation is not possible from anemone or peony and *Hosta* or *Phlox* to tree nursery crops.

5.2.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

Extrapolation from the protected culture of floriculture crops to nursery crops and perennials is possible because in general these crops are less susceptible for phytotoxicity compared to protected floriculture crops (see protected culture of floriculture crops).

5.3 Leaf disease

The extrapolation has reference to a treatment of the crop.

5.3.1 Efficacy

Test organism

- *Colletotrichum* spp.
- *Phoma viburni*
- *Septoria* spp.

Test crop

- lupine	*(colletotrichum* spp.)
- *Viburnum* **or** *Clematis*	*(phoma viburni)*
- *Hebe* **or** *Veronica*	*(septoria* spp.)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Colletotrichum* spp.	- all *Colletotrichum* spp.
- *Phoma viburni*	- *Phoma* spp.
- *Septoria* spp.	- all *Septoria* spp.

Leaf disease in tree nursery crops and perennials can be caused by a great variety of different fungal diseases. It is impossible to conduct research on all species.

Extrapolation is not possible from one fungal disease to another fungal diseases. If research was conducted to the three most important fungal diseases extrapolation is possible to the other fungal diseases in tree nursery crops and perennials.

b) crops

From:	To:
- lupine	- other tree nursery crops and perennials
- *Viburnum* **or** *Clematis*	- other tree nursery crops and perennials
- *Hebe* **or** *Veronica*	- other tree nursery crops and perennials

5.3.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.4 Grey mould

The extrapolation has reference to a treatment of the crop.

5.4.1 Efficacy

Test organism

- grey mould	- *Botryotinia fuckeliana (*old name: *Botrytis cinerea)*

Test crop

- cuttings of conifer **or** heath
- cuttings of *Acer* (avenue tree)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- grey mould	- *Botrytis* spp.

b) crops

From:	To:
- cuttings of conifer	- other tree nursery crops and perennials
- cuttings of heath	- other tree nursery crops and perennials

5.4.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.5 Mildew, powdery mildew

The extrapolation has reference to a treatment of the crop.

5.5.1 Efficacy

Test organism

- powdery mildew	*Sphaerotheca pannosa*
- powdery mildew (Quercus)	*Microsphaera alphitoides*

Test crop

- *Rosa canina,* rootstocks of rose	(powdery mildew)
- *Quercus robur,* oak	(powdery mildew)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- powdery mildew	- *Sphaerotheca* spp.
- powdery mildew (quercus)	- *Microsphaera* spp.
- *Sphaerotheca* **and** *Microsphaera*	- other species of powdery mildew in tree nursery crops and perennials

b) crops

From:	To:
- rootstocks of rose and oak	- other tree nursery crops and perennials

Extrapolation is possible from *Sphaerotheca* spp. in rootstocks of rose to the unprotected culture of cut flowers and potted plants.

A lot of different species of powdery mildew can be found in tree nursery crops and perennials. From practical experience it is known that products that provide a good control of powdery mildew in *Rosa canina (*rootstocks of rose) and *Quercus robur* (oak) also provide a good control of powdery mildew in other tree nursery crops and perennials. Besides that, the use of products against mildew in crops mentioned before is 50-75% of the total use of products against mildew in tree nursery crops and perennials.

5.5.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.6 Mildew, downy mildew

The extrapolation has reference to a treatment of the crop (protected and unprotected).

5.6.1 Efficacy

Test organism

- downy mildew in rose	*Pseudoperonospora sparsa*
- downy mildew	*Peronospora*

Test crop

- *Rosa corymbifera* 'Laxa' (culture of rootstocks or seedling) and/or *Hebe*	
- *Alyssum*	*(*downy mildew)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- downy mildew in rose	- *Pseudoperonospora* spp.
- downy mildew	- *Peronospora* spp.
- *Pseudoperospora* **and** *Peronospora*	- all species of downy mildew in tree nursery crops and perennials

b) crops

From:	To:
- rose and/or *Hebe*	- other tree nursery crops
- *Alyssum*	- other perennials

Rosa corymbifera 'Laxa' is a rootstock of rose that is susceptible for downy mildew. The research can be conducted also in another rootstock of rose that is susceptible for downy mildew.

5.6.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.7 *Phytophthora*

This extrapolation has reference to a treatment of the soil.

5.7.1 Efficacy

The most important species of *Phytophthora* in tree nursery crops are *Phytophthora cinnamomi, P. citricola* and *P. cactorum.* These fungal diseases cause root rot, stem rot and foot rot.

Test organism

- *Phytophthora cinnamomi*

This fungal disease is the most difficult to control.

Test crop

- *Chamaecyparis*

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Phytophthora cinnamomi*	- *Phytophthora* spp.

In comparison with other *Phytophthora* spp., *Phytophthora cinnamomi* is very hard to control.

b) crops

From:	To:
- *Chamaecyparis*	- other tree nursery crops and perennials

5.7.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.8 Rust

The extrapolation has reference to a treatment of the crop.

5.8.1 Efficacy

Test organism

- *Melampsora caprearum*
- *Melampsora hypericorum*

Test crop

- *Salix*	(*Melampsora caprearum)*
- *Hypericum*	*(Melampsora hypericorum)*

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- *Melampsora caprearum*	- *Melampsora caprearum* in other tree nursery crops and perennials
- *Melampsora hypericorum*	- *Melampsora hypericorum* in other tree nursery crops and perennials

If research was conducted in both test organisms extrapolation is possible to all rusts. Between both test organisms extrapolation is not possible.

b) crops

From:	To:
- *Salix*	- other tree nursery crops and perennials
- *Hypericum*	- other tree nursery crops and perennials

5.8.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.9 Sclerotinia rot

The extrapolation has reference to a treatment of the crop.

5.9.1 Efficacy

Test organism

- Sclerotinia rot — *Sclerotinia sclerotiorum*

Test crop

- *Skimmia*

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- Sclerotinia rot	-*Sclerotinia* spp.

b) crops

From:	To:
- *Skimmia*	- other tree nursery crops and perennials

5.9.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.10 Aphids

The extrapolation has reference to a treatment of the crop.

5.10.1 Efficacy

Test organism

- Cotton aphid or melon aphid (protected culture)	*Aphis gossypii*
- Green peach aphid	*Myzus persicae*
- Black bean aphid	*Aphis fabae*
- Potato aphid	*Macrosiphum euphorbiae*
- Rose aphid	*Macrosiphum rosae*
- Shallot aphid	*Myzus ascalonicus*
- Plum leaf-curling aphid	*Brachycaudus helichrysi*
- Beech aphid	*Phyllaphis fagi*

A lot of species aphids are common in the unprotected culture off tree nursery crops. Most of them are monophagous, this means that the aphis is related to one specific host plant. From the aphids mentioned above only the beech aphis is monophagous.The other aphids are polyphagous and have several host plants. These polyphagous aphids can be found also under protected conditions but not often on tree nursery crops.
A number of aphids can made changes of host plants during the year. They use woody crops as a winter host (e.g. peach potato aphid on *Prunus,* potato aphid on rose).

Test crop

- rose	
- *Hibiscus*	
- beech	(beech aphid)

If research is specified for the control of cotton aphid, research should be conducted inside. Cotton aphid is not common outdoors.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- one aphid specie	- other species of aphids with exception of cotton aphid and beech aphid
- cotton aphid (protected culture) + beech aphid + one other species of test organisms	- all aphids (protected and unprotected culture)
- beech aphid	- beech aphid and other species of aphids with exception of cotton aphid
- cotton aphid (protected culture)	- cotton aphid (unprotected culture) and other species of aphids with exception of beech aphid

Cotton aphid and beech aphid are hard to control. Extrapolation to all species of aphids is possible if research is conducted against cotton aphid, beech aphid and one other specie of aphids.
Extrapolation is not possible from other species of aphids to cotton aphid or beech aphid.
Extrapolation is also not possible from cotton aphid to beech aphid or the other way around.

b) crops

From:	To:
- rose	- other tree nursery crops and perennials
- *Hibiscus*	- other tree nursery crops and perennials
- beech	- all beech varieties

Extrapolation for aphids is possible from apple and pear to fruit trees and rootstocks of fruit trees.

5.10.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.11 Scale insects

The extrapolation has reference to a treatment of the crop.

5.11.1 Efficacy

Test organism

- common scale insect — *Parthenolecanium corni*

Test crop

- *Prunus laurocerasus*

Research can be conducted eventuallyin another host plant like *Berberis, Caenothus, Cotoneaster, Lonicera, Magnolia, Malus, Pyracantha* or *Taxus*

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- common scale insect	- other *Coccoidea* and *Diaspididae*

b) crops

From:	To:
- *Prunus laurocerasus* or another host plant	- other tree nursery crops and perennials

Extrapolation for scale insects is possible from apple and pear to fruit trees and rootstocks of fruit trees.

5.11.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.12 Clay-coloured weevil and leaf eating weevil

The extrapolation has reference to a treatment of the crop or a soil treatment depending on the stage to be controlled.

5.12.1 Efficacy

Test organism

- vine weevil	*Otiorhynchus sulcatus*

Test crop

- *Rhododendron*	- adults
- *Thuja*	- larvae

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- larvae of vine weevil	- larvae of *Otiorhynchus* spp.
- adults of vine weevil	- adults of *Otiorhynchus* spp. and leaf eating weevils (*Phyllobius*- and *Poludrusus* spp.)

Extrapolation is not possible from larvae to adults or the other way around. Larvae live in the soil and should be controlled in another way compared to adults situated in the crop.

b) crops

From:	To:
- *Rhododendron*	- other tree nursery crops and perennials
- *Thuja*	- other tree nursery crops and perennials

Extrapolation for larvae is possible from tree nursery crops to strawberry, black berry and raspberry

5.12.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.13 Caterpillars

The extrapolation has reference to a treatment of the crop.

5.13.1 Efficacy

Test organism

- leaf rollers	*Tortricidae*
- spring noctuid	*Orthosia* spp.

Test crop

- *Betula* **or** other deciduous tree	(leaf rollers)
- *Betula* **or** *Salix*	(spring noctuid)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- one specie of leaf roller	- all leaf rollers
- one specie of spring noctuid	- all species of caterpillars that lives on the crop for example caterpillars of brown tail moth, small ermine moth, *Pierus*- and *Mamestra* spp.

No extrapolation is possible from caterpillars of spring noctuid to caterpillars that mines in the leaves or to caterpillars that lives in wood.

b) crops

From:	To:
- test crop	- other tree nursery crops and perennials

Extrapolation for leaf rollers is possible from apple or pear to tree nursery crops included fruit tree and rootstocks of fruit tree and perennials.

5.13.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.14 Thrips

The extrapolation has reference to a treatment of the crop.

5.14.1 Efficacy

Test organism

- rose thrips — - *Thrips fuscipennis*

Test crop

- ose

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- rose thrips	- other *Thrips* spp. with exception of Western flower thrips (*Frankliniella occidentalis)*

In general *Thrips* spp. and other species of thrips do not create problems in tree nursery crops and perennials outdoors.
No extrapolation is possible to Western flower thrips because this specie is hard to control and can only be found outdoors in the neighbourhood of greenhouses and in warm summers.
Research against Western flower thrips should be conducted under protected conditions. No extrapolation is possible from protected culture to unprotected culture.

b) crops

From:	To:
- rose	- other tree nursery crops and perennials

5.14.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.15 Bugs

The extrapolation has reference to a treatment of the crop.

5.15.1 Efficacy

Test organism

- common green capsid bug — *Lygus pabulinus*

Test crop

- *Forsythia*

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- common green capsid bug	- other species of bug (*Meridae)*

b) crops

From:	To:
- *Forsythia*	- other tree nursery crops and perennials

Extrapolation of bugs is possible from apple and pear to fruit trees and rootstocks of apple and pear.

5.15.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.16 Mites, leaf mite and rust mite

The extrapolation has reference to a treatment of the crop.

5.16.1 Efficacy

Test organism

- bud mites	taxus bud mite buxus bud mite
and	
- rust mites	plum rust mite

Test crop

- *Buxus* **or** *Taxus*	(bud mites)
- *Prunus*	(rust mites)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- taxus bud mite or Buxus bud mite	- other bud mites
- plum rust mite	- other rust mites

Extrapolation is possible to all bud mites if both bud mites and rust mites are investigated.

b) crops

From:	To:
- test crop	- other tree nursery crops and perennials

Extrapolation of plum rust mite is possible from tree nursery crops to fruit crops and the other way around.

5.16.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.17 Mites, spider mites

The extrapolation has reference to a treatment of the crop.

5.17.1 Efficacy

Test organism

- two spotted spider mite	*Tetranychus urticae*
- European red spider mite	*Panonychus ulmi*
- orange lime mite	*Eotetranychus tiliarum*
- spruce spider mite	*Oligonychus ununguis*

Test crop

- *Callicarpa*	(two spotted spider mite)
- *Malus* **or** *Sorbus*	(European red spider mite)
- lime tree	(orange lime mite)
- *Chamaecyparis*	(spruce spider mite)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- two spotted spider mite	- *Tetranychus* spp.
- European red spider mite	- *Panonychus* spp.
- orange lime mite	- *Eotetranychus* spp.
- spruce spider mite	- *Oligonychus* spp.

No extrapolation is possible between the four species mentioned above.
Extrapolation is possible to all species of spider mite if research is conducted to all four species mentioned above and the results were good.

b) crops

From:	To:
- *Callicarpa*	- other tree nursery crops and perennials and public green
- *Malus* or *Sorbus*	
- lime tree	
- *Chamaecyparis*	

Extrapolation for two spotted spider mite is possible from the protected culture of floriculture crops to the protected and unprotected culture of tree nursery crops and perennials and public green spaces.
Extrapolation for fruit tree red spider mite is possible from apple and pear to fruit tree and rootstocks of apple and pear.

5.17.2 Phytotoxicity

See general chapter tree nursery crops and perennials.

5.18 Weeds in tree nursery crops

5.18.1 Efficacy

Test organism

group:

- annual grasses	e.g. meadow grass
- annual dicotyledonous weeds	e.g. common groundsel, fat hen
- perennial grasses	e.g. quecke
- perennial dicotyledonous weeds	e.g. creeping thistle, creeping yellow cress
- volunteers of cereals	e.g. wheat, barley

The weeds mentioned above are common species in the culture of tree nursery crops. Nevertheless other weed species can be suitable as a test weed.

Test crop

A lot of species belong to the group of tree nursery crops, therefore it is necessary to conduct research in several cultivations.
The following groups can be used as a test crop:
- sown crops (forest trees and hedging plants)
- conifers
- shrubs
- avenue trees

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- specific weed species in a crop	- same weed species in other crops
- application in unprotected culture	- application in protected soil bound culture
- application in unprotected culture of contact acting herbicides	- apllication of contact acting herbicides in potted plants

b) crops

From:	To:
- sowing crops of a certain species	- planted crop of the same species
- planted crops of a certain species	- sowing crops of the same species

Efficacy of soil acting herbicides against weed species in unprotected cultures cannot be extrapolated to the use in potted plants.

5.18.2 Phytotoxicity

See general chapter tree nursery crops and perennials. Besides that, for herbicides the following remarks are in force:

No extrapolation is possible from applications in unprotected cultures to the use in potted plants.

No extrapolation is possible from sown crops tot planted crops. Also no extrapolation is possible the other way around.

5.19 Weeds in perennials

5.19.1 Efficacy

Test organism

group:

- annual grasses	e.g. meadow grass
- annual dicotyledonous weeds	e.g. common groundsel, fat hen
- perennial grasses	e.g. quecke
- perennial dicotyledonous weeds	e.g. creeping thistle, creeping yellow cress
- volunteers of cereals	e.g. wheat, barley

The weeds mentioned above are common species in the culture of perennials. Nevertheless other weed species can be suitable as a test weed.

Test crop

- *Astilbe*
- *Hosta*
- *Paeonia*
- *Campanula*
- *Phlox*

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- specific weed species in a crop	- same weed species in other crops
- application in unprotected culture	- application in protected soil bound culture
- application in unprotected culture of contact acting herbicides	- apllication of contact acting herbicides in potted plants

b) crops

From:	To:
- sowing crops of a certain species	- planted crop of the same species
- planted crops of a certain species	- sowing crops of the same species

Efficacy of soil acting herbicides against weed species in unprotected cultures cannot be extrapolated to the use in potted plants.

Extrapolation is not possible from one weed species to another weed species because sensibility of weed species can be different.

5.19.2 Phytotoxicity

See general chapter tree nursery crops and perennials. Besides that, for herbicides the following remarks are in force:

No extrapolation is possible from sown crops to planted crops. Also no extrapolation is possible the other way around.

6 EDIBLE MUSHROOMS

6.1 General

There are no herbicides permitted in the culture of edible mushrooms. Consequently there is no expertise about this application. Possibilities of extrapolation of herbicides are at this time not known.

6.2 Bubbles

6.2.1 Efficacy

Test organism

- dry bubble disease **or**	*Verticillium fungicola var. fungicola*
- wet bubble disease	*Mycogene perniciosa*

Test crop

- cultivated mushroom

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- dry bubble	- wet bubble (*Mycogene perniciosa*), cobweb/mildew disease *(Hypomyces rosellus)*
- wet bubble	- dry bubble (*Verticillium fungicola* var. *fungicola*), cobweb/mildew disease *(Hypomyces rosellus)*

b) crops

Extrapolation to other edible mushrooms, like oyster fungus, is not possible. There are to many differences in time of application and the way these mushrooms are cultivated to make extrapolation possible. Moreover there is little expertise available in other species of edible mushrooms.

6.2.2 Mycotoxicity

It is necessary to conduct specific mycotoxicity trials in mushrooms. Extrapolation to other edible mushrooms is not possible, for the same reasons mentioned in the efficacy chapter above.

6.3 Gall midge

6.3.1 Efficacy

Test organism

- gall midge (larvae stadium) *Mycophila speyeri*

This species is most common.

Test crop

- cultivated mushroom

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- gall midge (*Mycophila speyeri*)	- gall midge (*Heteropeza pygmaea*), larvae stadium

b) crops

Extrapolation to other edible mushrooms, like oyster fungus, is not possible. There are to many differences in time of application and the way these mushrooms are cultivated to make extrapolation possible. Moreover there is little expertise available in other species of edible mushrooms.

6.3.2 Mycotoxicity

It is necessary to conduct specific mycotoxicity trials in mushrooms. Extrapolation to other edible mushrooms is not possible, for the same reasons mentioned in the efficacy chapter above.

6.4 Mite

6.4.1 Efficacy

Test organism

- common storage mite — - *Tyrophagus putrescentiae*

Test crop

- cultivated mushroom

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- common storage mite	- small mushroom mite *(Siteroptes mesembrinae* and *Pygmephorus sellnick*) - white mushroom mite *(Lupotarsonemus myceliophagus)*

b) crops

Extrapolation to other edible mushrooms, like oyster fungus, is not possible. There are to many differences in time of application and the way these mushrooms are cultivated to make extrapolation possible. Moreover there is little expertise available in other species of edible mushrooms.

6.4.2 Mycotoxicity

It is necessary to conduct specific mycotoxicity trials in mushrooms. Extrapolation to other edible mushrooms is not possible, for the same reasons mentioned in the efficacy chapter above.

7 FRUIT GROWING CROPS

7.1 General

Extrapolation is restricted to unprotected cultures with the exception of thrips in protected cultures. The protected culture of fruit growing crops is limited to a small area. The experience with extrapolation from protected cultures to unprotected cultures, or the other way around, is limited. With the extrapolations from apple and pear, trials should be conducted in the production culture of apple and pear.
Phytotoxicity: In case a plant protection product is authorised (or an application is submitted) in tree nursery crops, extrapolation is possible from red, white or black currant to blueberry. The reason for this is that *Vaccineum* species also belong to the group of tree nursery crops. If there is no phytotoxicity in tree nursery crops and berries, extrapolation is possible to blueberry.

7.2 Black currant leaf spot

Reference of the extrapolation is the treatment of a crop.

7.2.1 Efficacy

Test organism

- black currant leaf spot — *Drepanopeziza ribis*

Test crop

- red currant
or
- black currant
or
- gooseberry
or
- white currant

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- black currant leaf spot *(Drepanopeziza ribis)*	- black currant leaf spot *(Blumeriella jaappii*) - Mycosphaerella leaf spot *(Mycosphaerella pyri*)

b) crops

From:	To:
- red currant	- black currant, gooseberry, white currant, cherry and pear
- black currant	- red currant, gooseberry, white currant, cherry and pear
- gooseberry	- red currant, black currant, white currant, cherry and pear
- white currant	- red currant, black currant, gooseberry, cherry and pear

7.2.2 Phytotoxicity

For red currant, black currant, white currant and gooseberry phytotoxicity can be susceptible in the efficacy tests. Black-, white- and red currant are more susceptible for phytotoxicity in comparison with gooseberry. For that reason extrapolation from gooseberry to black currant, white currant and red currant is not possible.
Separate phytotoxicity trials should be conducted in cherry and pear. Sweet cherry has a preference above sour cherry, because sweet cherry is more susceptible for phytotoxicity.

Test crops

- red currant or black currant or white currant (depending on efficacy trials)
- sweet cherry
- pear

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- red currant	- black currant, white currant and gooseberry,
- black currant	- red currant, white currant and gooseberry
- white currant	- red currant, black currant and gooseberry
- sweet cherry	- sour cherry

Extrapolation is not possible between gooseberry, sweet cherry and pear.

7.3 Leaf- and stem diseases

Reference of the extrapolation is the treatment of a crop.

7.3.1 Efficacy

Test organism

- cane blight — *Leptosphaeria coniothyrium*

Test crop

- blackberry
or
- raspberry

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
cane blight	- Septoria leaf spot (*Septoria rubi*) in blackberry and raspberry - cane spot *(Elsinoe veneta)* in raspberry

b) Crops

From:	To:
- blackberry	- raspberry
- raspberry	- blackberry

7.3.2 Phytotoxicity

Phytotoxicity can be susceptible in the efficacy tests. Extrapolation from blackberry to raspberry is not possible because raspberry is more susceptible for phytotoxicity. Separate phytotoxicity trials need to be conducted in raspberry, when the efficacy trials are conducted in blackberry.

Test crops

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- raspberry	- blackberry

7.4 Grey mould (Botrytis fruit rot)

Reference of the extrapolation is the treatment of a crop.

7.4.1 Efficacy

Test organism

- grey mould (Botrytis fruit rot) — *Botryotinia fuckeliana* (formerly *Botrytis cinerea*)

Test crop

- strawberry (unprotected culture)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

There are no possibilities for extrapolation.

b) Crops

From:	To:
- strawberry (unprotected culture)	- strawberry (protected culture), red current, white current, black current, gooseberry, blueberry, grape, blackberry, raspberry, loganberry, plum, pear, cherry

7.4.2 Phytotoxicity

Test crops

- strawberry (protected conditions)
- red current **or** black current **or** white current
- raspberry
- sweet cherry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- strawberry (protected culture)	- strawberry (unprotected culture)
- red current **or** black current **or** white current	- red current, black current, white current, gooseberry
- raspberry	- blackberry
- sweet cherry	- sour cherry, plum

Extrapolation from strawberry, grape, and blueberry to the other test crops is not possible. In case a plant protection product is authorised (or an application is submitted) in tree nursery crops, extrapolation is possible from red, white or black currant to blueberry.
Plum, gooseberry and blackberry are less susceptible for phytotoxicity.

7.5 Shot hole disease

Reference of the extrapolation is the treatment of a crop.

7.5.1 Efficacy

Test organism

- shot hole disease — *Stigmina carpophila*

Test crop

- cherry (preference sweet cherry)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

There are no possibilities for extrapolation.

b) Crops

From:	To:
- cherry	- plum, peach

7.5.2 Phytotoxicity

Phytotoxicity can be susceptible in the efficacy tests. Sweet cherry has preference above sour cherry, because sweet cherry is more susceptible for phytotoxicity.

Test crops

- sweet cherry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sweet cherry	- sour cherry, plum, peach

7.6 Mildew, powdery mildew

Reference of the extrapolation is the treatment of a crop.

7.6.1 Efficacy

Test organism

- American gooseberry mildew	*Sphaerotheca morsuvae*
- powdery mildew	*Podosphaera leucotricha*
- powdery mildew	*Sphaerotheca apahanis*

Test crop

- gooseberry (*Sphaerotheca morsuvae*)
- apple (*Podosphaera leucotricha*)
- strawberry (*Sphaerotheca apahanis*)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- American gooseberry mildew	- American gooseberry mildew *(Sphaerotheca morsuvae)* in other crops - *Uncinula necator* (powdery mildew*),* in for example blackberry, raspberry and grape - *Sphaerotheca apahanis* (powdery mildew) in for example strawberry

Extrapolation from *Podosphaera leucotricha* to other organisms is not possible.

b) Crops

From:	To:
- apple	- pear and fruit tree cultures and fruit tree rootstocks of apple and pear
- gooseberry	- strawberry, red current, white current, black current, blackberry, raspberry and grape
- strawberry (preference stellingenteelt)	- strawberry (protected conditions), red current, white current, black current, blackberry, raspberry and grape

7.6.2 Phytotoxicity

Extrapolation is possible from red current or white current or black current to gooseberry. Extrapolation is possible from raspberry to blackberry because raspberry is more susceptible for phytotoxicity. Extrapolation is possible from the protected culture of strawberry to the unprotected culture of strawberry. For the other crops phytotoxicity trials are necessary or phytotoxicity can be susceptible in the efficacy trials.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple
- red current **or** black current **or** white current
- pear
- raspberry
- strawberry (protected conditions)

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- red current **or** black current **or** white current	- red current, black current, white current, gooseberry
- raspberry	- blackberry
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

Extrapolation from apple, pear, gooseberry and grape to other crops is not possible.

7.7 Scab

Reference of the extrapolation is the treatment of a crop.

7.7.1 Efficacy

Test organism

- scab	*Venturia inaequalis*

Test crop

- apple

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- scab (*Venturia inaequalis)* - scab *(Venturia cerasi)* in cherry - scab *(Venturia pirina)* in pear	- scab *(Venturia carpophila)* in peach and plum

b) crops

From:	To:
- apple	- pear, cherry, peach, plum and fruit tree cultures of apple and pear

7.7.2 Phytotoxicity

Phytotoxicity in apple can be susceptible in the efficacy tests. Phytotoxicity trials are necessary in pear, cherry, peach and plum. Extrapolation is possible from cherry to peach and plum, because cherry is more susceptible for phytotoxicity than peach and plum. Sweet cherry has preference above sour cherry, because sweet cherry is more susceptible for phytotoxicity.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops
- apple
- pear
- sweat cherry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sweat cherry	- sour cherry, peach and plum
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

7.8 Brown rot

Reference of the extrapolation is the treatment of a crop.

7.8.1 Efficacy

Test organism

- brown rot — *Monilia laxa*

Test crop

- cherry (sour)
or
- plum

Monilia is a common disease in sour cherry.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- brown rot	- brown rot *(Monilia laxa)*
	- fruit rot (*Monilia laxa, Monilia fructigena*)

Fruit rot is a common disease in sweet cherry.

b) Crops

From:	To:
- sour cherry	- sweet cherry and plum
- plum	- sour cherry and sweet cherry

7.8.2 Phytotoxicity

Sweet cherry has preference, because sweet cherry is more susceptible for phytotoxicity.

Test crops

- sweet cherry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sweet cherry	- sour cherry, plum, peach

7.9 Fruit tree canker

Reference of the extrapolation is the treatment of a crop.

7.9.1 Efficacy

Test organism

- fruit tree canker — *Nectria galligena*

Test crop

- apple

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

There are no possibilities for extrapolation.

b) Crops

From:	To:
- apple	- pear and fruit tree culture of apple and pear

7.9.2 Phytotoxicity

Extrapolation from apple to pear and vice versa is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures. Phytotoxicity can be susceptible in the efficacy tests.

Test crops
- apple **and** pear

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

7.10 Aphids

Reference of the extrapolation is the treatment of a crop.

7.10.1 Efficacy

Test organism

- rosy apple aphid	*Dysaphis plantaginea*
- currant blister aphid	*Cryptomyzus ribis*
- green apple aphid	*Aphis pomi*
- yellow rose aphid	*Rhodobium porosum*
- melon or cotton aphid	*Aphis gossypii*

These aphis species are the most severe to control.

Test crop

- apple (rosy apple aphid and green apple aphid)
- red currant (currant blister aphid)
- strawberry, protected culture (yellow rose aphid in protected culture, cotton aphid in protected and unprotected crop)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- rosy apple aphid	- apple-grass aphid *(Rhopalosiphum insertum), Rhopalosiphoninus ribesinus, Dysaphis anthrisci,* green peach aphid *(Myzus persicae),* rosy leaf-curling aphid *(Dysaphis devecta* and *D. anthrisci),* pear aphid *(Dysaphis pyri),Amuraphis farfarae*, black bean aphid *(Aphis fabae), Melanaphis pyaria*, apple aphid *(Aphis pomi)* grain aphid *(Sitobion fragariae)*, large raspberry aphid *(Amphorophora rubi)*, permanent blackberry aphid (*Aphis ruborum),* leaf-curling raspberry aphid *(Aphis idaei)*, brown peach aphid *(Brachycaudus prunicola),* plum leaf-curling aphid *(Brachycaudys helichrysi)*, currant sowthistle aphid *(Hyperomyzus lactucae)*, lettuce aphid *(Nasonovia ribisnigri)*, large raspberry aphid *(Amphorophora idaei)*, permanent currant aphid *(Aphis schneideri),* peach aphid *(Hyalopterus amygdali),* mealy plum aphid *(Hyalopterus pruni)*, cherry aphid *(Myzus cerasi)*
- red currant blister aphid	- currant blister aphid *(Cryptomyzus ribis)*
- apple aphid	- cereal aphid *(Sitobion fragariae),* large raspberry aphid *(Amphorophora rubi),* permanent blackberry aphid *(Aphis ruborum),* leaf-curling raspberry aphid *(Aphis idaei)*, *Rhopalosiphoninus ribesinus*, green peach aphid *(Myzus persicae)*, black bean aphid *(Aphis fabae)*, *Melanaphis pyaria*

- yellow rose aphid	strawberry aphid (*Chaetosiphon fragaefolii*), *Fimbriaphis fimbriata*, rose aphid (*Macrosiphum rosae*), lettuce aphid (*Nasanovia ribis-nigri*), cotton aphid (*Aphis gossypii*), shallot aphid (*Myzus ascolonicus*), black bean aphid (*Aphis fabae*)
- cotton aphid	strawberry aphid (*Chaetosiphon fragaefolii*), *Fimbriaphis fimbriata*, rose aphid (*Macrosiphum rosae*), lettuce aphid (*Nasanovia ribis-nigri*), shallot aphid (*Myzus ascolonicus*), black bean aphid (*Aphis fabae*)

b) Crops

From:	To:
- apple	- pear, black current, red current, white current, blueberrry gooseberry, blackberry, raspberry, cherry, peach, plum and fruit tree cultures of apple and pear
- red current	- black current, white current, gooseberry
- strawberry (protected culture)	- strawberry (unprotected culture)

Extrapolation from apple or red current to strawberry is possible. In these cultures other species of aphids occur.

7.10.2 Phytotoxicity

Phytotoxicity can be susceptible in the efficacy tests in strawberry, apple and red current.
Extrapolation is possible from red current to black current, white current and gooseberry. In case a plant protection product is authorised (or an application is submitted) in tree nursery crops, extrapolation is possible from red, white or black currant to blueberry.
Extrapolation from raspberry to blackberry is possible because raspberry is more susceptible for phytotoxicity.
Extrapolation is possible from cherry to peach or plum. Sweet cherry has preference, because sweet cherry is more susceptible for phytotoxicity in comparison with sour cherry.
Extrapolation from apple to pear and vice versa is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity.
When russeting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crop

- apple **and**
- pear
- sweet cherry
- red currant
- raspberry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sweet cherry	- sour cherry, peach and plum
- red currant or white currant or black currant	- red currant, white current, black currant and gooseberry
- raspberry	- blackberry
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

7.11 Tortrix moth

Reference of the extrapolation is the treatment of a crop.

7.11.1 Efficacy

Test organism

- summer fruit tortrix moth	*Adoxophyes orana*

Test crop

- apple

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- summer fruit tortrix moth	- fruit tree tortrix moth *(Archips podana)*, rose tortrix moth *(Archips rosana),* apple brown tortrix *(Pandemis heparana)*, marbled orchard tortrix *(Hedya dimidioalba)*, tortrix moth *(Clepsis spectrana)*

b) crops

From:	To:
- apple	- pear
- fruit growing cultures	- tree nursery crops, perennials and public green spaces

7.11.2 Phytotoxicity

Extrapolation from apple to pear and vice versa is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity. Phytotoxicity in apple can be susceptible in the efficacy tests.

Test crops

- apple and pear

POSSIBILITIES OF EXTRAPOLATION

Extrapolation to other crops is not possible.

From:	To:
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

7.12 Psyllids

Reference of the extrapolation is the treatment of a crop.

7.12.1 Efficacy

Test organism

- pear psylla — *Cacopsylla pyricola, C. pyri*

There are three species of pear psylla: the common pear psyllid *(Cacopsylla pyricola)*, European pear sucker *(Cacopsylla pyri)* and the large pear psylla *(Cacopsylla pyrisuga)*. The large pear psylla is rare and for that reason not taken into account. In practice the common pear psyllid and the European pear sucker cannot be distinguished. There are no differences in sensitivity for pesticides.

Test crop

- pear

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- pear psylla	- apple leaf sucker *(Cacopsylla mali)*

There are two reasons why pear psylla is chosen as test organism: pear psylla is more common than apple leaf sucker and apple leaf sucker is more susceptible for pesticides. Between both species there are no differences in biology that would make extrapolation not possible.

b) Crops

From:	To:
- pear	- apple

7.12.2 Phytotoxicity

Extrapolation from apple to pear and vice versa is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures. Phytotoxicity in pear can be susceptible in the efficacy tests.

Test crops

- apple and pear

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

Extrapolation to other crops is not possible.

7.13 Leafhoppers

Reference of the extrapolation is the treatment of a crop.

7.13.1 Efficacy

Test organism

- raspberry leafhopper *(Macropsis fuscula)*
or
- rose leafhopper *(Edwardsiana rosae)*

Test crop

- raspberry (raspberry leafhopper)
or
- apple (rose leafhopper)

Raspberry leafhopper and rose leafhopper are important pests, which appear frequently.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- raspberry leafhopper	- froggatt's apple leafhopper *(Edwardsiana crataegi*, green leafhopper *(Empoasca vitis)* and rose leafhopper (*Edwardsiana rosae)*
- rose leafhopper	- froggatt's apple leafhopper *(Edwardsiana crataegi),* green leafhopper *(Empoasca vitis)* and raspberry leafhopper *(Macropsis fuscula)*

b) Crops

From:	To:
- raspberry	- apple and fruit tree cultures and fruit tree rootstocks of apple
- apple	- raspberry and fruit tree cultures and fruit tree rootstocks of apple

7.13.2 Phytotoxicity

Phytotoxicity can be susceptible in the efficacy tests. Trials have to be conducted in apple and raspberry. Extrapolation from apple to raspberry and vice versa is not possible.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- raspberry
and
- apple

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- raspberry	- blackberry
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

7.14 Fruit moth

Reference of the extrapolation is the treatment of a crop.

7.14.1 Efficacy

Test organism

- codling moth — *Cydia pomonella*

Test crop

- apple

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- codling moth	- plum fruit moth *(Cydia funebrana)*

b) Crops

From:	To:
- apple	- pear and plum
- fruit growing cultures	- tree nursery crops, perennials and public green

7.14.2 Phytotoxicity

In apple phytotoxicity can be susceptible in the efficacy tests. Extrapolation from apple to pear and plum is not possible. Phytotoxicity trials have to be conducted in these crops. Extrapolation between apple, plum and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple **and** pear
- plum

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

Extrapolation to other crops is not possible.

7.15 Leaf midges

Reference of the extrapolation is the treatment of a crop.

7.15.1 Efficacy

Test organism

- black currant leaf midge	*Dasineura tetensi*

Test crop

- red currant
or
- black currant
or
- white currant

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- black currant leaf midge	- apple leaf curling midge *(Dasineura mali),* pear leaf curling midge *(Dasineura pyri)*

There are no big differences in the biology of black currant leaf midge, apple curling leaf midge and pear curling leaf midge. For that reason extrapolation between these species is possible. Extrapolation is only possible in case of a systemic acting product. These types of product are able to control the leaf midges sufficient, which live between curled leaves.

Three other species of leaf midge are important: raspberry cane midge *(Resseliella theobaldi),* occulation gallmidge *(Resseliella oculiperda)* and pear midge *(Contarinia pyrivora).* There are big differences in biology between these three species and black currant leaf midge. There are also mutual differences between these three species. Extrapolation for efficacy is therefore not possible.

b) Crops

From:	To:
- red currant	- apple, pear, gooseberry, white currant, black currant
- black currant	- apple, pear, gooseberry, white currant, red currant
- white currant	- apple, pear, gooseberry, red currant, black currant

7.15.2 Phytotoxicity

For red, white and black currant, phytotoxicity can be susceptible in the efficacy tests. Extrapolation from red, white and black currant to apple and pear is not possible. These crops require separate phytotoxicity trials. Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity. Phytotoxicity trials have to be conducted in apple **and** pear.

Test crops

- red currant **or** black currant **or** white currant
- apple
- pear

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- red currant **or** black currant **or** white currant	- red currant, black currant, white currant, gooseberry

7.16 Weevils

Reference of the extrapolation is the treatment of a crop.

7.16.1 Efficacy

Test organism

- strawberry blossom weevil — *Anthonomus rubi*

Test crop

- strawberry (unprotected culture)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- strawberry blossom weevil	- raspberry beetle *(Byturus tomentosus)* - strawberry blossom weevil *(Anthonomus rubi)* in blackberry and raspberry

Strawberry blossom weevil is more common than raspberry blossom weevil.

b) Crops

From:	To:
- strawberry	- blackberry and raspberry

In small fruit more species of weevils appear. These or not important or extrapolation is not possible.

7.16.2 Phytotoxicity

Phytotoxicity in strawberry can be susceptible in efficacy trials. Extrapolation from strawberry to blackberry and raspberry is not possible. For these crops specific phytotoxicity trials need to be conducted. Raspberry is a good test crop, because raspberry is more susceptible for pesticides than blackberry.

Test crops

- raspberry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- raspberry	- blackberry

7.17 Caterpillars of clearwing

Reference of the extrapolation is the treatment of a crop.

7.17.1 Efficacy

Test organism

- apple clearwing moth — *Synanthedon myopaeformis*

Test crop

- apple

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- apple clearwing moth	- currant clearwing moth *(Synanthedon tipuliformis)*

b) Crops

From:	To:
- apple	- red currant, black currant, white current, gooseberry, fruit tree cultures and fruit tree rootstocks of apple

7.17.2 Phytotoxicity

Phytotoxicity in apple can be susceptible in the efficacy tests. Extrapolation from apple to red, white or black currant and gooseberry is not possible. These crops require separate phytotoxicity trials. Red, white or black current are good test crops. These crops are more susceptible for phytotoxicity than gooseberry.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple
- red **or** black **or** white currant

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- red or black or white currant	- red currant, black currant, white currant, gooseberry
- apple	- fruit tree cultures and fruit tree rootstocks of apple

7.18 Caterpillars of winter moth and clouded drab moth

Reference of the extrapolation is the treatment of a crop.

7.18.1 Efficacy

Test organism

- winter moth	*Operophtera brumata*
or	
- clouded drab moth	*Orthosia spp.*

Test crop

- apple
or
- pear

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- winter moth	- clouded drab moth
- clouded drab moth	- winter moth

b) Crops

From:	To:
- apple	- pear, cherry, plum and blueberry
- pear	- apple, cherry, plum and blueberry
- apple and pear	- tree nursery crops, perennials and public green

7.18.2 Phytotoxicity

Phytotoxicity in apple and pear can be susceptible in the efficacy tests. Extrapolation from apple and pear to cherry, plum and blueberry is not possible. These crops require separate phytotoxicity trials. Sweet cherry is a good test crop for cherry and plum. It is possible to extrapolate from sweet cherry to plum and sour cherry. Sweet cherry is more susceptible to phytotoxicity. In case a plant protection product is authorised (or an application is submitted) in tree nursery crops, extrapolation is possible from red, white or black currant to blueberry. There is no expertise about extrapolation from blueberry to other crops. Blueberry requires separate phytotoxicity trials.

Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity. When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple **and** pear
- sweet cherry
- blueberry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sweet cherry	- sour cherry and plum
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

Extrapolation from apple, pear and blueberry to other crops is not possible. In case a plant protection product is authorised (or an application is submitted) in tree nursery crops, extrapolation is possible from red, white or black currant to blueberry.

7.19 Scale insect

Reference of the extrapolation is the treatment of a crop.

7.19.1 Efficacy

Test organism

- oystershell scale — *Lepidosaphes ulmi*

Test crop

- apple

Oystershell scale is more common in apple compared to pear, so apple is chosen as test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- oystershell scale	- *Quadraspidotus ostreaformis*

There are no big differences in the biology of the oyster shell scale and the *Quadraspidotus ostreaformis*. The differences, which do exist, do not disturb extrapolation.

b) Crops

From:	To:
- apple	- pear and fruit tree cultures and fruit tree rootstocks of apple and pear

7.19.2 Phytotoxicity

Phytotoxicity in apple can be susceptible in the efficacy tests. Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity. In pear separate phytotoxicity trials are required.

When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple **and** pear

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	fruit tree cultures and fruit tree rootstocks of pear

Extrapolation to other crops is not possible.

7.20 Thrips (protected culture)

Reference of the extrapolation is the treatment of a crop.

7.20.1 Efficacy

Test organism

- western flower thrips — - *Frankliniella occidentalis*

Test crop

- strawberry (protected culture)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- western flower thrips	- onion thrips *(Thrips tabaci),* rose thrips *(Thrips fuscipennis)*

Western flower thrips lives hidden and therefore they are hard to control. If a good control of Western flowers thrips is found, onion thrips and rose thrips are expected to be controlled as well.

b) Crops

From:	To:
- strawberry (protected culture)	- strawberry (unprotected culture), blackberry, raspberry, grapes, peach (protected culture)

7.20.2 Phytotoxicity

Phytotoxicity in strawberry can be susceptible in the efficacy tests. Extrapolation from strawberry to blackberry, raspberry, grapes and peach is not possible. These crops require separate phytotoxicity trials. When phytotoxicity trials are conducted in raspberry, extrapolation to blackberry is possible. Raspberry is more susceptible to phytotoxicity than blackberry.
There is no expertise about extrapolation from grapes and peach to other crops. These crops require separate phytotoxicity trials.

Test crops

- raspberry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- raspberry	- blackberry

7.21 Bugs

Reference of the extrapolation is the treatment of a crop.

7.21.1 Efficacy

Test organism

- common green capsid	*Lygocoris pabulinus*

Test crop

- apple
or
- red currant

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- common green capsid	- mullein bug *(Campylomma verbasci)* - apple brown bug *(Atractotomus mali)*

b) Crops

From:	To:
- apple	- pear, black currant, red currant, gooseberry, blackberry, raspberry, white currant, strawberry, fruit tree cultures and fruit tree rootstocks of apple and pear
- red currant	- Apple, pear, black currant, gooseberry, blackberry, raspberry, white currant, strawberry, fruit tree cultures and fruit tree rootstocks of apple and pear

7.21.2 Phytotoxicity

Phytotoxicity for apple and pear can be susceptible in the efficacy tests. Extrapolation is possible from red currant to black currant, gooseberry and white currant. Strawberry, pear, raspberry and blackberry require separate phytotoxicity trials. When phytotoxicity trials are conducted in raspberry, extrapolation to blackberry is possible. Raspberry is more susceptible to phytotoxicity than blackberry.

Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity. In pear separate phytotoxicity trials are required.

When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple and pear
- red currant or black currant or white currant
- raspberry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- red currant or black currant or white currant	- red currant, white currant, black currant and gooseberry
- raspberry	- blackberry
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

7.22 Mites, bud mites

Reference of the extrapolation is the treatment of a crop.

7.22.1 Efficacy

Test organism

- (black) currant bud mite — *Cecidophyopsis ribis*

Test crop

- black currant

Black currant mite is most common in black currant.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- black currant bud mite	- filbert bud mite (*Phytoptus avellanae*)

b) Crops

From:	To:
- black currant	- red current, white currant, gooseberry, hazel

7.22.2 Phytotoxicity

Phytotoxicity in black currant can be susceptible in the efficacy tests. Hazel requires separate phytotoxicity trials.

Test crops

- black currant
- hazel

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- black currant	- red currant, white currant, gooseberry

7.23 Mites, rust mites

Reference of the extrapolation is the treatment of a crop.

7.23.1 Efficacy

Test organism

- apple rust mite — *Phyllocoptes schlechtendali*
or
- *Epitremesus pyri*

Test crop

- apple
or
- pear

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- apple rust mite	- *Epitremesus pyri*, plum nursery mite *(Phyllocoptes fockeui)* and raspberry leaf and bud mite (*Phyllocoptes gracilis)*
- *Epitremesus pyri*	- apple rust mite, plum nursery mite *(Phyllocoptes fockeui)* and raspberry leaf and bud mite *(Phyllocoptes gracilis)*

b) Crops

From:	To:
- apple	- pear, plum, raspberry
- pear	- apple, plum, raspberry

7.23.2 Phytotoxicity

Phytotoxicity in apple and pear can be susceptible in the efficacy tests. Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity. When efficacy trials are conducted in apple, separate phytotoxicity trials in pear are required and vice versa.
When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures. Plum and raspberry require separate phytotoxicity trials.

Test crops

- apple **and** pear
- plum
- raspberry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- raspberry	- blackberry
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

7.24 Mites, spider mites

Reference of the extrapolation is the treatment of a crop.

7.24.1 Efficacy

Test organism

- two-spotted spider mite	*Tetranychus urticae*
- European red mite	*Panonychus ulmi*
- gooseberry red spider mite	*Bryobia ribis*

Test crop

- apple (two-spotted spider mite and European red mite)
- black currant or red currant or white currant or blackberry or raspberry (gooseberry red spider mite and two-spotted spider mite)
- strawberry and vine (two-spotted spider mite)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- two-spotted spider mite	- two-spotted spider mite *(Tetranychus urticae)* in other crops, fruit tree spider mite (*Tetranychus viennensis*), European red mite (*Panonychus ulmi*)
- European red mite	- European red mite *(Panonychus ulmi* in other crops*),* almond brown mite *(Bryobia rubrioculus)*
- gooseberry red spider mite	- gooseberry red spider mite *(Bryobia ribis)* in other crops

Extrapolation between test organisms is not possible.

b) Crops

From:	To:
- apple (two-spotted spider mite)	- cherry, pear, plum, red currant, black currant, white currant, gooseberry, blackberry, raspberry, vine, strawberry
- apple (European red mite)	- cherry, pear, plum, fruit tree cultures and fruit tree rootstocks of apple and pear
- red or white or black currant or blackberry or raspberry (gooseberry red spider mite)	- black currant, white currant, gooseberry, blackberry and raspberry

Extrapolation of two-spotted spider mite is possible from tree nursery crops and floriculture crops to fruiting crops where two-spotted spider mite appears. Extrapolation from European red mite is possible from fruiting crops to tree nursery crops and floriculture crops and public green where European red mite appears.

7.24.2 Phytotoxicity

Phytotoxicity can partly be susceptible in the efficacy tests. Extrapolation is possible between black, red and white currant. From these crops extrapolation is possible to gooseberry.
In the crops where no efficacy trials are conducted, separate phytotoxicity trials are required.

Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and there are other parameters used to asses phytotoxicity. When efficacy trials are conducted in apple, separate phytotoxicity trials in pear are required and vice versa.

When russetting is found in trials conducted in the production culture of apple and pear, but no symptoms on the leaf or negative influence on the growth are found, extrapolation to fruit tree cultures and fruit tree rootstocks of apple and pear is possible. Russetting is not an issue in these cultures. Plum and raspberry require separate phytotoxicity trials.

Test crops

- raspberry
- sweet berry
- red currant **or** black currant **or** white currant
- strawberry

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- sweet cherry	- sour cherry and plum
- raspberry	- blackberry
- red currant or white currant or black currant	- red currant, black currant, white currant, gooseberry
- strawberry (protected culture)	- Strawberry (open air culture)
- apple	- fruit tree cultures and fruit tree rootstocks of apple
- pear	- fruit tree cultures and fruit tree rootstocks of pear

Extrapolation from apple, pear and vine to other crops is not possible. In case a plant protection product is authorised (or an application is submitted) in tree nursery crops, extrapolation is possible from red, white or black currant to blueberry.

7.25 Weeds

7.25.1 Efficacy

Test organism

Group:	
- annual grasses	e.g. annual meadow-grass, Cokspur grass, Black grass or Wind grass
- annual dicotyledonous	e.g. chickweed, Common groundsel, Field speedwell
- perennial grasses	e.g. couchgrass
- perennial dicotyledonous and other perennial weeds	e.g. creeping thistle, Water smartweed, Common horsetail

The weed species that are mentioned are common in fruit growing crops. Beside the mentioned species, other weed species are suitable also.

Test crop

For extrapolation of efficacy it does not matter in which crop trials are conducted, as long as time of application, assortment of weeds etc. is comparable between the crops. In case of soil herbicides, soil type is an important factor.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

From:	To:
- specific weed species in a crop	- the same weed species in other crops
- contact herbicide against a weed species (unprotected culture)	- contact herbicide against the same weed species (protected soil bound culture)
- when trials are conducted with three weed species from the group annual grasses or dicotyledonous	- other weed species from the same group, only applies to annual weeds

Extrapolation from one weed species to other weed species is not possible, because of the difference between the sensitivity of the weed species for a herbicide. When trials are conducted with three weed species from the group annual dicotyledonous or annual grasses, extrapolation is possible to the total group. This does not mean that all weeds of this group are susceptible. The susceptible weeds should be mentioned on the label.

Extrapolation from efficacy against weeds in protected soil bound cultures to unprotected cultures is not possible. Weeds in unprotected cultures are more hardened off and for that reason less susceptible for herbicides. Weed control in protected crops is hardly ever conducted.

b) Crops

From:	To:
- one crop	- all other fruit growing cultures
- apple	- wind breaks, fruit tree cultures and fruit tree rootstocks of apple and pear

For the efficacy of soil herbicides extrapolation from the unprotected culture to the culture in containers is not possible.

For the efficacy of contact- and soil herbicides, extrapolation from the unprotected culture to culture on artificial substrate (e.g. strawberries on peat bags or water). There is no experience of the efficacy of herbicides on artificial substrates.

7.25.2 Phytotoxicity

Test crops
Extrapolation from one crop to another is not possible for contact herbicides and soil herbicides. Separate phytotoxicity trials are necessary. Below some exceptions are given:

Crops

From:	To:
- white currant or red currant or black currant or gooseberry	- white currant, red current, black current and gooseberry
- raspberry	- blackberry
- young plantation of a crop (only soil herbicides)	- established plantation of the same crop (only soil herbicides)
- raspberry or blackberry (protected culture)	- raspberry or blackberry (unprotected culture)
- strawberry (Culture of runnerplants)	- strawberry production culture or selection fields, extrapolation vice versa is also possible
- nursery crops of the same crops which are used as wind breaks	- wind breaks

Extrapolation from other currant species to blueberry (= *Vaccinium* sp.) and vice versa is not possible. In case a plant protection product is authorised (or an application is submitted) in tree nursery crops, extrapolation is possible from red, white or black currant to blueberry.

Extrapolation from crops in unprotected cultures to the same crops in protected cultures is not possible. Crops grown in protected cultures are more susceptible to herbicides.

Extrapolation from the production culture of apple and pear to fruit tree cultures and fruit tree rootstocks of apple and pear is not possible. There is no expertise on available on this extrapolation.

8 Grassland

8.1 Weeds

8.1.1 Efficacy

Test organism

Group:	
- annual grasses	e.g. meadow grass
- annual dicotyledonous weeds	e.g. chickweed, shepherd's purse, red dead-nettle
- perennial grasses	e.g. quecke
- perennial dicotyledonous weeds	e.g. creeping thistle, big nettle, broad-leaved dock, dandelion, sharp butter cup

The weeds mentioned above are common species in grassland. Nevertheless other weed species can be suitable as a test weed.

Test crop

If the time of treatment, the covering of the soil by the grass and the species of weeds are comparable it is not important in which varieties of grass species research has been conducted.
For soil acting herbicides the kind of soil is also important.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- from one group of test weeds (e.g. annual grasses) at least three species should be tested *)	other weed species of the same group

*) For perennial dicotyledonous weeds and perennial grasses extrapolation to the group is not possible. These weeds are very specific therefore for each weed specie research is required.

b) Crops

From:	To:
- use of herbicide in young grassland	- use of same herbicide in older grassland

Extrapolation is not possible from one weed specie to another weed specie because the sensibility of weed species can be different. Extrapolation to one group of weed species (only annual weeds) is possible when at least three species of that specific group have been tested and results are good. This does not mean that all weed species from that group can be controlled. Weeds that can be controlled should be mentioned on the label.
For perennial dicotyledonous weeds and perennial grasses extrapolation to the group is not possible. These weeds are very specific therefore for each weed specie research is needed.

8.1.2 Phytotoxicity

Test crops

The mixtures used for grassland consist meanly or only of perennial ryegrass. Besides perennial ryegrass some mixtures consist also of Timothy, meadow fescue and smooth-stalked meadow grass. Mixtures for grassland can also consist of white clover.

From:	To:
- young grassland of certain mixture	- older grassland of the same mixture

9 Vegetable and herb growing (unprotected culture)

9.1 General

In this chapter extrapolation is mentioned between vegetables in unprotected cultures. It is mentioned specific when extrapolation to protected cultures is possible.
In unprotected cultures, phytotoxicity for insecticides and fungicides can be observed in efficacy trials. Chinese cabbage, broccoli and cauliflower are more susceptible to phytotoxicity compared to other cabbage crops.
In case the efficacy trials are not carried out in one of these crops, it is necessary to conduct separate phytotoxicity trials when the whole group of cabbages is claimed. Chinese cabbage has preference above the other crops. When good results are found in Chinese cabbage, extrapolation to the total group of cabbages is possible.
Herbicides require separate phytotoxicity trials. The possibility of phytotoxic reactions in herbicide trials is larger and the consequences (especially the economic consequences) are also larger in comparison with insecticide and fungicide trials.
The group head cabbage includes: red cabbage, white cabbage, Savoy cabbage and pointed head cabbage
The group *Lactuca sativa* spp. includes: head lettuce, iceberg lettuce, oak-leaf lettuce, Lollo Rosso, Lollo bionda, curled lettuce, leaf lettuce and cos lettuce.

9.2 Leaf spot diseases, black spot

Reference of the extrapolation is the treatment of a crop.

9.2.1 Efficacy

Test organism

- Alternaria leaf spot **or**	*Alternaria brassicae* **or**
- dark leaf spot	*Alternaria brassicicola*

There is no difference in sensitivity for plant protection products between both species.

Test crop

- Chinese cabbage

Chinese cabbage is susceptible for infestation and shows a clear pattern of damage.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
Alternaria brassicae	*Alternaria brassicicola*
Alternaria brassicicola	*Alternaria brassicae*

b) Crops

From:	To:
- Chinese cabbage	- cauliflower, broccoli, kale, pak-choi cabbage, Indian mustard, head cabbage and Brussels sprouts - protected culture of breeding and seed production of cabbage crops. More sprays may be needed or the treatments need to be repeated with shorter intervals in protected cultures. This aspect should be taken in account in the judgement of the chemical.

9.2.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Chinese cabbage

Chinese cabbage is more susceptible for phytotoxicity in comparison with other cabbage crops. Chinese cabbage has no wax layer.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- Chinese cabbage	- cauliflower, broccoli, kale, pak-choi cabbage, Indian mustard, head cabbage and Brussels sprouts - extrapolation to protected breeding and seed production of cabbage crops is not possible.

Extrapolation from the protected culture of floriculture or vegetable crops to the protected culture of breeding and seed production is possible.

9.3 Leaf spot diseases, ring spot disease

Reference of the extrapolation is the treatment of a crop.

9.3.1 Efficacy

Test organism

- ringspot — *Mycosphaerella brassicicola*

Test crop

- Brussels sprouts
- Indian mustard
- pak-choi cabbage

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- Brussels sprouts	- cauliflower, broccoli, kale and head cabbage
- Indian mustard	- Brussels sprouts, cauliflower, broccoli, kale, head cabbage and pak-choi cabbage
- pak-choi cabbage	- Brussels sprouts, cauliflower, broccoli, kale, head cabbage and Indian mustard
- Indian mustard or pak-choi cabbage	- protected culture of breeding and seed production of cabbage crops. More sprays may be needed or the treatments need to be repeated with shorter intervals in protected cultures. This aspect should be taken in account in the judgement of the chemical.

Extrapolation from Brussels sprouts to Indian mustard and pak-choi cabbage is not possible. Compared to Brussels sprouts these crops demand a higher level of control.

9.3.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Brussels sprouts
- Indian mustard
- pak-choi cabbage
- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- Brussels sprouts	- head cabbage
- Indian mustard	- pak-choi cabbage, Brussels sprouts, cauliflower, broccoli, kale
- pak-choi cabbage	- Indian mustard, Brussels sprouts, cauliflower, broccoli, kale
- Chinese cabbage, head cabbage, Brussels sprouts	- cauliflower, broccoli, kale, pak-choi cabbage, Indian mustard

Extrapolation to the protected culture of breeding and seed production of cabbage crops is not possible.

Extrapolation from the protected culture of floriculture or vegetable crops to the protected culture of breeding and seed production is possible.

9.4 Leaf spot diseases, Phoma lingam

Reference of the extrapolation is the treatment of a crop.

9.4.1 Efficacy

Test organism

- black leg disease, stem canker — *Phoma lingam*

Test crop

- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- Chinese cabbage	- Indian mustard and pak-choi cabbage

9.4.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Chinese cabbage

Chinese cabbage is more susceptible for phytotoxicity in comparison with other cabbage crops. Chinese cabbage has no wax layer.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- Chinese cabbage	- Indian mustard, pak-choi cabbage, cauliflower, broccoli, kale, Brussels sprouts and head cabbage

9.5 Leaf spot diseases, *Septoria apiicola*

Reference of the extrapolation is the treatment of a crop.

9.5.1 Efficacy

Test organism

- celery leaf spot — *Septoria apiicola*

Test crop

- celery

Celery is susceptible to infection. While no infection is allowed, the level of control of celery leaf spot must be very high.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- celery	- celeriac, parsley, chervil, celery leaves

9.5.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- celery

Celery is more susceptible to phytotoxicity in comparison with celeriac.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- celery	- celeriac, parsley, chervil, celery leaves

9.6 Onion leaf blight

Reference of the extrapolation is the treatment of a crop.

9.6.1 Efficacy

Test organism

- onion leaf blight — *Botrytis squamosa*

Test crop

- 1st year onion set

Because of the high density of the crop canopy onion set is most susceptible for infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic - protected culture of breeding and seed production of onions. More sprays may be needed or the treatments need to be repeated with shorter intervals in protected cultures. This aspect should be taken in account in the judgement of the plant protection product.

9.6.2 Phytotoxicity

Can be observed in the efficacy tests. Between the several onion and shallots species there are no differences in sensitivity to phytotoxicity.

Test crops

- 1st year onion set

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic

Extrapolation to the protected culture of breeding and seed production of onion is not possible.

Extrapolation from the protected culture of floriculture or vegetable crops to the protected culture of breeding and seed production is possible.

9.7 Chocolate spot, Botrytis fabae

Reference of the extrapolation is the treatment of a crop.

9.7.1 Efficacy

Test organism

- chocolate spot — *Botrytis fabae*

Test crop

- broad bean

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- broad bean	- faba bean

9.7.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- broad bean

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- broad bean	- faba bean

9.8 Grey mould and sclerotinia blight in legumes

Reference of the extrapolation is the treatment of a crop.

9.8.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckeliana*
- sclerotinia blight (white mould)	*Sclerotinia sclerotiorum*

Test crop

- bean (*Phaseolus vulgaris)*

Of all legumes the bean is most susceptible to infection of grey mould and sclerotinia rot.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation between the two fungi is not possible.

b) Crops

From:	To:
- bean (*Phaseolus vulgaris)*	- pole snap bean, runner bean, dwarf slicing bean, pole slicing bean, sugar pea and snap bean

9.8.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- bean (*Phaseolus vulgaris)*

Between the different legumes there are no differences in sensitivity to phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- bean (*Phaseolus vulgaris)*	- pole snap bean, runner bean, dwarf slicing bean, pole slicing bean, sugar pea and snap bean

9.9 Club root of cabbage

Reference of the extrapolation is the treatment of the soil.

9.9.1 Efficacy

Test organism

- club root — *Plasmodiophora brassicae*

Test crop

- cauliflower
- broccoli

Both crops are sensible for infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- cauliflower	- broccoli, kale, head cabbage, Indian mustard and pak-choi cabbage
- broccoli	- cauliflower, kale, head cabbage, Indian mustard and pak-choi cabbage

9.9.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- cauliflower
- broccoli
- Chinese cabbage

Chinese cabbage is more susceptible for phytotoxicity in comparison with other cabbage crops. Chinese cabbage has no wax layer.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cauliflower	- broccoli, kale, head cabbage
- broccoli	- cauliflower, kale, head cabbage
- Chinese cabbage	- cauliflower, broccoli, kale, head cabbage, Brussels sprouts, Indian mustard and pak-choi cabbage

9.10 Onion neck rot in shallots

Reference of the extrapolation is the treatment of a crop.

9.10.1 Efficacy

Test organism

- onion neck rot — *Botrytis aclada*

Test crop

- 1st year onion set

Because of the high density of the crop canopy onion set is most susceptible to infection. In a 1st year onion set, the demands for controlling onion neck are high.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic

9.10.2 Phytotoxicity

Can be observed in the efficacy tests. Between the different onion species there are no differences in sensitivity to phytotoxicity.

Test crops

- 1st year onion set

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic

9.11 Alternaria leaf blight

Reference of the extrapolation is the treatment of a crop.

9.11.1 Efficacy

Test organism

- Alternaria leaf blight — *Alternaria dauci*

Test crop

- winter carrot (not-disinfected seed)

Alternaria dauci is a seed-borne fungi. Efficacy trials need to be carried out with seeds that are not disinfected. Between the different varieties there are hardly any differences in sensitivity for *Alternaria dauci*. *Alternaria dauci* needs moisture for developing. *Alternaria dauci* is especially a problem at the end of the season, because of the volume of the foliage dense canopy, which remains moist for a long time (structure of the crop, dense canopy). Therefore it is recommended to conduct efficacy trials in carrots that will be harvested in September or October. Winter carrot has a high risk of infection, because of the great volume of the foliage. For this reason winter carrot is preferred as test crop. Besides the great volume of the foliage, there are higher demands for controlling the disease in winter carrot. Winter carrot is stored after harvest, and storing carrots, which are infected with alternaria leaf blight, can give problems during storage.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- winter carrot	- bunched carrots and washed carrots

9.11.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter carrot (not-disinfected seed)

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter carrot	- bunched carrots and washed carrots

9.12 Mildew, brassica powdery mildew

Reference of the extrapolation is the treatment of a crop.

9.12.1 Efficacy

Test organism

- brassica powdery mildew — *Erysiphe cruciferarum*

Test crop

- Brussels sprouts
- cauliflower
- broccoli

Brassica powdery mildew appears in these crops.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- one of the mentioned crop above	- the other mentioned crops above, cabbage and curled kale - protected culture of breeding and seed production of cabbage crops. More sprays may be needed or the treatments need to be repeated with shorter intervals in protected cultures. This aspect should be taken in account in the judgement of the chemical.

9.12.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- cauliflower
- broccoli
- Brussels sprouts
- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- broccoli	- cauliflower, curled kale, Brussels sprouts and head cabbage
- cauliflower	- broccoli, curled kale, Brussels sprouts and head cabbage
- Brussels sprouts	- curled kale and head cabbage
- Chinese cabbage	- cauliflower, broccoli, Brussels sprouts, curled kale, Indian mustard, pak-choi cabbage and head cabbage

Extrapolation to the protected culture of breeding and seed production of cabbage is not possible.

Extrapolation from the protected culture of floriculture or vegetable crops to the protected culture of breeding and seed production is possible.

9.13 Mildew, lettuce downy mildew in head lettuce and iceberg lettuce

Reference of the extrapolation is the treatment of a crop.

9.13.1 Efficacy

Test organism

- lettuce downy mildew — *Bremia lactucae*

Test crop

- head lettuce

Head lettuce is most susceptible to infection of lettuce downy mildew.
Note: resistant varieties are not suitable as test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- head lettuce	- *Lactuca sativa* spp.

Under one condition this extrapolation is possible: the number of treatments must be the same. Extrapolation from unprotected cultures to protected cultures is possible. Infections in unprotected cultures are usually heavier than infections in protected cultures.

9.13.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- head lettuce

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- *Lactuca sativa* spp., endive and green Belgian endive

Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity when the crop is treated with a plant protection product. Iceberg lettuce has firmer, hardener leaves and is less susceptible for phytotoxicity. Other lettuce varieties have similar leaf structures. Head lettuce can serve as a model for other lettuce varieties.

9.14 Mildew, downy mildew in onion and shallot

Reference of the extrapolation is the treatment of a crop.

9.14.1 Efficacy

Test organism

- onion downy mildew — *Peronospora destructor*

Test crop

- 1st year onion set

Because of the dense structure of the crop canopy this onion set is most susceptible to infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic
- seed onions	1ste year onion set, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic

9.14.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- 1st year onion set

Between the different onion species there are no differences in sensitivity to phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic

9.15 Mildew, downy mildew in cabbage crops

Reference of the extrapolation is the treatment of a crop.

9.15.1 Efficacy

Test organism

- brassica downy mildew	*Peronospora parasitica*

Test crop

- broccoli on plant beds	plant beds of cauliflower, Brussels sprouts and head cabbage
- cauliflower on production field	production fields of broccoli, Brussels sprouts and head cabbage

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- broccoli on plant beds	- plant beds of cauliflower, Brussels sprouts and head cabbage
- cauliflower on production field	- production fields of broccoli, Brussels sprouts and head cabbage

Downy mildew is not a problem in other cabbage crops.

9.15.2 Phytotoxicity

Phytotoxicity cannot be observed in the efficacy tests. Assessments on plant beds are hard when damage is caused by downy mildew.

Test crops

- broccoli on plant beds

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- broccoli	- Brussels sprouts, cauliflower, curled kale, head cabbage

9.16 Leaf spot diseases (white tip disease) in leek, onion and shallots

Reference of the extrapolation is the treatment of a crop.

9.16.1 Efficacy

Test organism

- leek white tip — *Phytophthora porri*

Test crop

- Leek
- 2nd year onion set

Leek is most susceptible for an infection of leek white tip.
In comparison with seed onions, onion sets are more susceptible for infection of leek white tip.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- leek	- planted onions, seed onions, seed- and planted shallots
- 2nd year onion set	- seed onions, seed shallots, planted shallots

In other onion crops leek white tip is not a problem.

9.16.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- 2nd year onion set

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- 2nd year onion set	- seed onions, seed shallots, planted shallots

Between the different onion species and shallots there are no differences in sensitivity to phytotoxicity. For that reason extrapolation to all onion species is possible. Extrapolation between leek and onion is not possible. There are to many differences in habitus of the crop.

9.17 Rust, white blister in cabbage crops

Reference of the extrapolation is the treatment of a crop.

9.17.1 Efficacy

Test organism

- white blister — *Albugo candida*

Test crop

- Brussels sprouts
- cauliflower
- broccoli

White blister is a common disease in these crops.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- one of the mentioned test crops above	- the other mentioned test crops, curled kale, radish, black radish and head cabbage - protected culture of breeding and seed production of cabbage crops. More sprays may be needed or the treatments need to be repeated with shorter intervals in protected cultures. This aspect should be taken in account in the judgement of the chemical.

9.17.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- broccoli
- cauliflower
- Brussels sprouts
- radish or black radish

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- broccoli	- cauliflower, kale, head cabbage and Brussels sprouts
- cauliflower	- broccoli, kale, Brussels sprouts, head cabbage
- Brussels sprouts	- kale, head cabbage
- radish or black radish	- black radish respectively radish

Extrapolation to the protected culture of breeding and seed production of cabbage is not possible.

Extrapolation from the protected culture of floriculture or vegetable crops to the protected culture of breeding and seed production is possible.

9.18 Mould in endive, head lettuce and iceberg lettuce

Reference of the extrapolation is the treatment of a crop.

9.18.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckeliana*
- stem canker	*Thanatephorus cucumeris*
- Sclerotinia blight (white mould)	*Sclerotinia minor*

Test crop

- head lettuce

Head lettuce is most susceptible for above-mentioned diseases.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- head lettuce	- endive, green Belgian endive, *Lactuca sativa* spp. and fresh herbs

The number of treatments must be the same.

9.18.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Head lettuce

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- endive, green Belgian endive, *Lactuca sativa* spp. and fresh herbs

Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity when the crop is treated with a chemical. Iceberg lettuce has firmer, hardener leaves and is less susceptible for phytotoxicity. Other lettuce varieties have similar leaf structures. Head lettuce can serve as a model for other lettuce varieties.

9.19 Mould in cabbage crops

Reference of the extrapolation is the treatment of a crop.

9.19.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckeliana*
- stem canker	*Thanatephorus cucumeris*

Mould can also be caused by sclerotinia blight. This is only an issue in Chinese cabbage.

Test crop

- Chinese cabbage

Chinese cabbage is susceptible for above-mentioned diseases.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- Chinese cabbage	- grey mould in kohlrabi, pak-choi cabbage, Indian mustard, radish and black radish
- Chinese cabbage	- stem canker in pak-choi cabbage, Indian mustard, radish and black radish

Grey mould and stem canker appear in above-mentioned crops.

9.19.2 Phytotoxicity

For Chinese cabbage phytotoxicity can be observed in the efficacy tests. For radish and black radish separate phytotoxicity trials are needed.

Test crops

- Chinese cabbage
- black radish or radish

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- Chinese cabbage	- kohlrabi, pak-choi cabbage, Indian mustard, cauliflower, broccoli, Brussels sprouts, head cabbage and curled kale
- black radish or radish	- black radish respectively radish

There is no expertise about extrapolation from Chinese cabbage to black radish and radish.

9.20 Onion white rot in onions/ shallots

Reference of the extrapolation is the treatment of a crop.

9.20.1 Efficacy

Test organism

- onion white rot — *Sclerotium cepivorum*

Test crop

- 1st year onion set

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic

9.20.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- 1st year onion set

Between the different onion species and shallots there are no differences in sensitivity to phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- 1st year onion set	- seed onions, 2nd year onion set, silver skin onions, pickles, seed- and planted shallots and garlic

9.21 Stem canker in cabbage crops

Reference of the extrapolation is the treatment of a crop.

9.21.1 Efficacy

Test organism

- stem canker — *Thanatephorus cucumeris*

Test crop

- cauliflower

Cauliflower is susceptible for bottom rot.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- cauliflower	- broccoli, kale, head cabbage and Brussels sprouts

9.21.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- cauliflower

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cauliflower	- broccoli, kale, head cabbage and Brussels sprouts

9.22 Cutworms

Reference of the extrapolation is the treatment of the soil before the start of the culture.

9.22.1 Efficacy

Test organism

- cutworms — *Agrotis* spp

Test crop

- endive
- iceberg lettuce

For efficacy assessments there is no preference for one of the mentioned test crops. Iceberg lettuce has preference for phytotoxicity assessments.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- cutworms	- *Agrotis* spp

Cutworms are larvae of special kinds of night-flying moths (*Agrostis* spp.). There is no difference in sensitivity for plant protection products between the different cutworm species.

b) Crops

From:	To:
- endive	- *Lactuca sativa* spp., green Belgian endive lamb's lettuce and fennel
- iceberg lettuce	- endive, green Belgian endive, *Lactuca sativa* spp., lamb's lettuce and fennel

Cutworms mainly cause damage in planted vegetable crops, particularly in above-mentioned crops. Damage in sown crops can appear. It is not a problem in sown crops due to the high number of plants.

9.22.2 Phytotoxicity

Iceberg lettuce is a suitable test crop for soil treatment because of its slow development compared to endive, head lettuce and lamb's lettuce. Slow developing crops are susceptible to phytotoxicity.

Test crops

- iceberg lettuce

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- iceberg lettuce	- endive, green Belgian endive, *Lactuca sativa* spp., lamb's lettuce and fennel

9.23 Flea beetles

Reference of the extrapolation is the treatment of a crop.

9.23.1 Efficacy

Test organism

- crucifer flea beetle — *Phyllotreta cruciferae*

Crucifer flea beetle is the most common specie.

Test crop

- radish

Flea beetles cause a lot of damage in crucifers (with the exception of black radish, witch is less susceptible). Radish is most susceptible for infestation of the crucifers.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- crucifer flea beetle	- remaining flea beetles (*Phyllotreta* spp.*)*

b) Crops

From:	To:
- radish	- gherkins, cauliflower, broccoli, kale, beetroot, black radish, head cabbage and Brussels sprouts

9.23.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- radish
- gherkins

Gherkins are susceptible to phytotoxicity. It concerns a crop with not many roots and big leafs. This enlarges the chance on phytotoxicity. Cabbage crops have a wax layer and are for that reason less susceptible to phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- radish	- cauliflower, broccoli, kale, beetroot, black radish, head cabbage and Brussels sprouts
- gherkins	- cauliflower, broccoli, kale, beetroot, radish, black radish, head cabbage and Brussels sprouts

It is possible to determine phytotoxicity on radish. Extrapolation to gherkins is in that case not possible. Gherkins are more susceptible for phytotoxicity than radish.

9.24 Leaf aphids (with the exception of the cabbage aphid)

Reference of the extrapolation is the treatment of a crop.

9.24.1 Efficacy

Test organism

- lettuce aphid	*Nasonovia ribisnigri*
- green peach aphid	*Myzus persicae*

The lettuce aphid is especially in leaf crops like lettuce the most common and most harmful leaf aphid. This aphid crawls away deep in the hart of the crop.
Note: There are lettuce varieties, which are resistant to lettuce aphids. These varieties are not suitable as test crop.

Test crop

- iceberg lettuce	- in iceberg lettuce, lettuce aphid has a hidden way of living
- Chinese cabbage	- green peach aphid: Chinese cabbage is the most susceptible cabbage crop

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- lettuce aphid	- potato aphid *(Macrosiphum euphorbiae),* glasshouse potato aphid *(Aulacorthum solani)*, brown sowthistle aphid *(Uroleucon sonchi)*
- green peach aphid	- black bean aphid *(Aphis fabae)* en lettuce aphid *(Nasonovia ribisnigri*) **Extrapolation to lettuce aphid in iceberg lettuce is not possible, because of the hidden way of living in iceberg lettuce.** - other leaf aphids species which appear in herbs

b) Crops

From:	To:
- iceberg lettuce	- endive, green Belgian endive, blanched celery and green celery, celeriac, Florence fennel, fennel, kohlrabi, beet root, pak-choi cabbage, Indian mustard, rhubarb, redloof, *Lactuca sativa* spp., slicing bean, lamb's lettuce, witloof (root growing culture) and fresh herbs
- Chinese cabbage	- Gherkins, blanched celery and green celery, courgettes, patisson, celeriac, Florence fennel, fennel, kohlrabi, beet root, pak-choi cabbage, Indian mustard, leek, rhubarb, redloof, *Lactuca sativa* spp., green Belgian endive, endive, slicing bean, spinach, lamb's lettuce, witloof and chicory roots (root growing culture), French bean, runner bean, parsley, chervil and celery leaves

Extrapolation to all vegetable crops where leaf aphids appear is possible, when trials are carried out in iceberg lettuce and Chinese cabbage. Extrapolation to carrots is however not possible. Small carrot aphids only appear in carrots; extrapolation from other aphid species is not possible.

Extrapolation to cotton aphid and cabbage aphid is not possible because:
- Melon aphid (cotton aphid) doesn't appear often in outdoor crops and there is no expertise if extrapolation from lettuce aphid or green peach aphid to cotton aphid is possible.
- Cabbage aphid has a hidden way of living. Possibilities for extrapolations can be found in the next chapter.

9.24.2 Phytotoxicity

Phytotoxicity in Chinese cabbage can be observed in the efficacy tests.

Test crops

- head lettuce
- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- *Lactuca sativa* spp., endive, green Belgian endive and fresh herbs
- Chinese cabbage	- cauliflower, broccoli, kale, pak-choi cabbage, Indian mustard, head cabbage and Brussels sprouts

Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity when the crop is treated with a chemical. Iceberg lettuce has firmer, hardener leaves and is less susceptible for phytotoxicity. Other lettuce varieties have similar leaf structures. Head lettuce can serve as a model for other lettuce varieties.

9.25 Leaf aphid, cabbage aphid

Reference of the extrapolation is the treatment of a crop.

9.25.1 Efficacy

Test organism

- cabbage aphid — *Brevicoryne brassicae*

Test crop

- Brussels sprouts

Cabbage aphid in Brussels sprouts is most hard to control.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- cabbage aphid	- cabbage aphid, green peach aphid, lettuce aphid and black bean aphid

Of all aphid species cabbage aphid is most hard to control.

b) Crops

From:	To:
- Brussels sprouts	- blanched celery, cauliflower, broccoli, kale, celeriac, fennel, kohlrabi, beet root, pak-choi cabbage, Indian mustard and head cabbage

9.25.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Brussels sprouts
- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- Brussels sprouts	- kale and head cabbage
- Chinese cabbage	- cauliflower, broccoli, kale, head cabbage, Brussels sprouts, pak-choi cabbage, Indian mustard, blanched celery, celeriac, beet root and kohlrabi

9.26 Swede midge

Reference of the extrapolation is the treatment of a crop.

9.26.1 Efficacy

Test organism

- Swede midge — *Contarinia nasturtii*

Test crop

- broccoli

Broccoli is susceptible for infection. Damage is more severe in comparison with other cabbage crops because broccoli has several growing points. Besides this, broccoli is an open, high crop. Swede midge is transported with the wind.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- broccoli	- Brussels sprouts, cauliflower, Chinese cabbage and head cabbage

9.26.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- broccoli

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- broccoli	- head cabbage, cauliflower and Brussels sprouts

9.27 Cabbage root fly

Reference of the extrapolation is the treatment of the tray or foot of the plant or a soil treatment.

9.27.1 Efficacy

Test organism

- cabbage root fly *Delia brassicae*

Test crop

- cauliflower for treatment of tray or foot of the plant
- radish or black radish for treatment of the soil

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- cauliflower	- broccoli, kale, swederape, swede, kohlrabi, head cabbage and Brussels sprouts (tray treatment and treatment of the foot of the plant)
- radish	- black radish
- black radish	- radish

Radish and black radish are sown on the spot. The control of cabbage root fly in these crops can only take place by a treatment of the field. Extrapolation from cauliflower is not possible for this reason. Supplementary crop treatments are necessary in order to get a conclusive control of cabbage root fly in Chinese cabbage after a tray treatment. Cabbage root fly lays its eggs in the head of Chinese cabbage. Extrapolation to Chinese cabbage is not possible.

9.27.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- cauliflower
- radish
- black radish

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cauliflower	- broccoli, kale, swederape, swede, kohlrabi, head cabbage and Brussels sprouts
- radish	- black radish
- black radish	- radish

9.28 Leafminers

Reference of the extrapolation is the treatment of a crop.

9.28.1 Efficacy

Test organism

- pea leafminer — *Liriomyza huidobrensis*

Test crop

- pak-choi cabbage
- Indian mustard
- radish
- black radish

In these crops infestation appears easily and damage in these crops is easy to evaluate.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

Phytomyza spp. and *Agromyzidae* can also appear in the field production of vegetable crops. There is no expertise about possibilities of extrapolation from *Liriomyza huidobrensis* to these species.

b) Crops

From:	To:
- one of the mentioned test crops above	- the other mentioned test crops and endive, green Belgian endive, gherkins, blanched celery, Chinese cabbage and *Lactuca sativa* spp., fresh herbs.

9.28.2 Phytotoxicity

Test crops

- head lettuce
- gherkins

Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity when the crop is treated with a chemical. Iceberg lettuce has firmer, hardener leaves and is less susceptible for phytotoxicity. Other lettuce varieties have similar leaf structures. Head lettuce can serve as a model for other lettuce varieties.
Gherkins are susceptible for plant protection products also.
There is no expertise about possibilities for extrapolation from head lettuce to gherkins. For that reason trials need to be carried out in head lettuce and gherkins.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- the other mentioned test crops and endive, blanched celery, Chinese cabbage, green Belgian endive and *Lactuca sativa* spp., fresh herbs.
- gherkins	- radish, black radish

9.29 Leek moth

Reference of the extrapolation is the treatment of a crop.

9.29.1 Efficacy

Test organism

- leek moth — *Acrolepiopsis assectella*

Test crop

- leek
- seed onion
- 1st / or 2nd year set
- silver skin onion
- pickles

Leek moth can be a problem in one of the mentioned crops. For efficacy assessments there is no preference for one of the mentioned test crops. Leek has preference for phytotoxicity assessments.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- one of the mentioned test crops above	- the other mentioned test crops above

9.29.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- leek

Leek is more susceptible for phytotoxicity in comparison with the other test crops.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- leek	- seed onion, 1st year set, 2nd year set, silver skin onion, pickles

9.30 Wireworms

Reference of the extrapolation is the treatment of the soil before planting.

9.30.1 Efficacy

Test organism

- wireworms — *Agriotes* spp.

Test crop

- endive
- head lettuce
- iceberg lettuce

Wireworms are a problem in all three crops. For efficacy assessments there is no preference for one of the mentioned test crops. Iceberg lettuce has preference for phytotoxicity assessments.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- wireworms	- other *Agriotes* spp.

b) Crops

From:	To:
- one of the mentioned test crops above	- the other mentioned test crops and *Lactuca sativa* spp.

9.30.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- iceberg lettuce

Iceberg lettuce is a suitable test crop for soil treatment because of its slow development compared to endive, head lettuce and lamb's lettuce. Slow developing crops are susceptible to phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- iceberg lettuce	- endive, green Belgian endive and *Lactuca sativa* spp.

9.31 Caterpillars, cabbage larvae

Reference of the extrapolation is the treatment of a crop.

9.31.1 Efficacy

Test organism

- diamondback moth — *Plutella xylostella*

Of all cabbage larvae the caterpillars of the diamondback moth are the hardest to control.

Test crop

- cauliflower
- head cabbage

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- diamondback moth	- large white (*Pieris brassicae*), small white (*Pieris rapae*), cyclamen tortrix (*Clepsis spectrana*), cabbage moth (*Mamestra brassicae*) and garden pebble (*Evergestis forficalis*)

Large white and cyclamen tortrix usually don't cause economic damage.

b) Crops

From:	To:
- cauliflower	- broccoli, kale, Chinese cabbage, pak-choi cabbage, Indian mustard, head cabbage and Brussels sprouts
- head cabbage	- broccoli, cauliflower, Chinese cabbage, pak-choi cabbage, Indian mustard and Brussels sprouts

Cabbage larvae can be a plague in these crops.

9.31.2 Phytotoxicity

Test crops

- cauliflower
- head cabbage
- Chinese cabbage

Chinese cabbage is more susceptible for phytotoxicity in comparison with other cabbage crops. Chinese cabbage has no wax layer.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cauliflower	- broccoli, kale, head cabbage, Brussels sprouts
- head cabbage	- Brussels sprouts
- Chinese cabbage	- cauliflower, broccoli, kale, pak-choi cabbage, Indian mustard, head cabbage and Brussels sprouts

9.32 Caterpillars, not being cabbage larvae

Reference of the extrapolation is the treatment of a crop.

9.32.1 Efficacy

Test organism

- silver y moth — *Autographa gamma*

Test crop

- endive
- swede
- head lettuce
- iceberg lettuce

Caterpillars of silver y moth are a problem in all test crops. For efficacy assessments there is no preference for one of the mentioned test crops. Head lettuce has preference for phytotoxicity assessments.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- one of the mentioned test crops above	- the other mentioned test crops, *Lactuca sativa* spp., green Belgian endive and fresh herbs

9.32.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- head lettuce

Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity when the crop is treated with a chemical. Iceberg lettuce has firmer, hardener leaves and is less susceptible for phytotoxicity. Other lettuce varieties have similar leaf structures. Head lettuce can serve as a model for other lettuce varieties.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- endive, green Belgian endive, swede, *Lactuca sativa* spp. and fresh herbs

9.33 Thrips, onion

Reference of the extrapolation is the treatment of a crop.

9.33.1 Efficacy

Test organism

- onion thrips — *Thrips tabaci*

Test crop

- seed onion

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation from one test organism to another test organism or to other organisms is not possible.

b) Crops

From:	To:
- seed onion	- 1st year set, 2nd year set, pickles, silver skin onion, seed- and planted shallots, bunched onion and garlic - sugar and fodder beets (cabbage thrips), dry peas and canned peas (cabbage thrips and pea thrips)

In beets and peas the demands for the level of control are lower in comparison with onion. Also control of thrips in beets and peas is easier. For these reasons extrapolation to these crops is possible.

Infestation with thrips is also a problem in leek and head cabbage. Extrapolation from onion to leek and head cabbage is not possible. Thrips in leek (young larvae) and head cabbage have a hidden way of live in contradistinction with thrips in onions. Extrapolation from leek to head cabbage is not possible either. Adult thrips in leek are good to control because they live on the outside of the leaves. Young larvae in leek have a hidden way of live. In head cabbage all stages of the thrips have a hidden way of live. There is no expertise about possibilities of extrapolation from head cabbage to leek.

Note: Tolerant varieties do exist in head cabbage.

9.33.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- seed onion

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- seed onion	- 1st year set, 2nd year set, pickles, silver skin onion, seed- and planted shallots, bunched onion and garlic

9.34 Thrips in cabbage crops

Reference of the extrapolation is the treatment of a crop.

9.34.1 Efficacy

Test organism

- onion thrips *Thrips tabaci*

Test crop

- white cabbage

White cabbage is susceptible to infestation with trips. Besides that, thrips in head cabbage (white cabbage) has a hidden way of live and is for that reason hard to control.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- white cabbage	- red cabbage, Savoy cabbage, pointed head cabbage, Brussels sprouts, cauliflower and broccoli

Infestation with thrips is also a problem in leek. Extrapolation from onion or head cabbage to leek is not possible. Thrips in leek (young larvae) have a hidden way of live in contradistinction with thrips in onions. Extrapolation from leek to head cabbage is not possible either. Adult thrips in leek are good to control because they live on the outside of the leaves. Young larvae in leek have a hidden way of live. In head cabbage all stages of the thrips have a hidden way of live. There is no expertise about possibilities of extrapolation from head cabbage to leek.

Note: Tolerant varieties do exist in head cabbage.

9.34.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- Chinese cabbage	- head cabbage, Brussels sprouts, cauliflower, broccoli, Indian mustard, pak-choi cabbage and kale

9.35 Onion leafminer

Reference of the extrapolation is the treatment of a crop.

9.35.1 Efficacy

Test organism

- onion leafminer — *Liriomyza cepae*

Test crop

- leek

Infestation with onion leafminer is especially a problem in leek.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- leek	- seed- and planted shallots, bunched onion, seed onion, 1st and 2nd year set, silver skin onion, pickles and garlic

9.35.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- leek

Leek is susceptible for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- leek	- seed- and planted shallots, bunched onion, seed onion, 1st and 2nd year set, silver skin onion, pickles and garlic

9.36 Carrot fly

Reference of the extrapolation is the treatment of a crop.

9.36.1 Efficacy

Treatment of the soil does not take place anymore. The costs were too high. Soil treatments are replaced by crop treatments.

Test organism

- carrot fly *Psila rosae*

Stages
Flies (adults of the first generation)

Test crop

- winter carrot, common carrot or washed carrot

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- winter carrot, common carrot or washed carrot	- carrot, blanched celery, celeriac, Florence fennel, fennel, parsnip, celery and parsley

The crop treatment in winter carrot is pointed on the first generation of the carrot fly, in the other mentioned crops it is pointed on the second and third generation. Extrapolation for efficacy is possible from controlling of the first generation in winter carrot. Most of the time the mentioned crops escape from damage caused by the carrot fly because of the late start of the culture. Control in bunched carrots or winter carrots also take place by coating of the seed.

9.36.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- winter carrot, common carrot or washed carrot

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- winter carrot, common carrot or washed carrot	- carrot, blanched celery, celeriac, fennel and parsnip

9.37 Lettuce root aphid

Reference of the extrapolation is the treatment of a crop.

9.37.1 Efficacy

Test organism

- lettuce root aphid — *Pemphigus bursarius*

Test crop

- endive

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- endive	- *Lactuca sativa* spp., green Belgian endive

Note:
Quite a lot of head lettuce varieties are resistant against lettuce root aphid.

9.37.2 Phytotoxicity

Test crops

- head lettuce

Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity when the crop is treated with a chemical. Iceberg lettuce has firmer, hardener leaves and is less susceptible for phytotoxicity. Other lettuce varieties have similar leaf structures.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- endive, green Belgian endive and *Lactuca sativa* spp.

9.38 Mites, two spotted spider mite

Reference of the extrapolation is the treatment of a crop.

9.38.1 Efficacy

Test organism

- two spotted spider mite — *Tetranychus urticae*

Test crop

- bean (*Phaseolus* spp.)

Two spotted spider mite is a problem in bean, (dwarf and pole) runner bean and gherkin.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- bean	- other beans (*Phaseolus spp*.) and gherkin, courgette and patisson

Extrapolation is possible from the protected cultures of vegetables to the unprotected cultures of beans, gherkin, courgette and patisson. In the protected cultures the pressure of spider mites is higher than in the unprotected cultures.

9.38.2 Phytotoxicity

Test crops

- bean (*Phaseolus* spp.)
- gherkin

There is no expertise about possibilities of extrapolation from bean to gherkin. For that reason phytotoxicity trials need to be carried out in bean as well as in gherkin.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- bean (*Phaseolus* spp.)	- other beans (*Phaseolus* spp.)
- gherkin	- gherkin, patisson and courgette

9.39 Snails, slugs

Reference of the extrapolation is the treatment of a crop.

9.39.1 Efficacy

Test organism

- grey field slug	*Deroceras reticulatum*

This species is most common.

Test crop

- cauliflower
- broccoli
- head lettuce
- head cabbage

In these crops snails are a problem and it is possible to control them.
For efficacy assessments there is no preference for one of the mentioned test crops. Head lettuce has preference for phytotoxicity assessments.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- grey field slug	- grey garden slug (*Arion circumscriptus*) and striped slug *(Arion silvaticus*)

b) Crops

From:	To:
- one of the mentioned test crops above	- the other mentioned test crops, endive, green Belgian endive and *Lactuca sativa* spp.

The control of slugs in kale and Brussels sprouts is very difficult. The behaviour of the slugs on these crops is different from the behaviour of the slugs on the test crops. In kale the slugs stay on the leaves, what makes them unreachable for the present plant protection products. In Brussels sprouts they hide under fallen leaves and are for that reason unreachable for plant protection products.

9.39.2 Phytotoxicity

Test crops

- head lettuce

Head lettuce has thin leaves and is for that reason more susceptible for phytotoxicity when the crop is treated with a chemical. Iceberg lettuce has firmer, hardener leaves and is less susceptible for phytotoxicity. Other lettuce varieties have similar leaf structures. Head lettuce can serve as a model for other lettuce varieties.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- cauliflower, broccoli, head cabbage, endive, green Belgian endive and *Lactuca sativa* spp.

9.40 Weeds

9.40.1 Efficacy

Test weeds

Groups:	
- annual grasses	e.g. annual meadow-grass, cokspur grass
- volunteers of cereals	e.g. wheat, barley
- annual dicotyledonous	e.g. chickweed, lambsquaters, smartweed
- perennial grasses	e.g. couchgrass
- perennial dicotyledonous	e.g. creeping thistle, water smartweed

The weed species that are mentioned are common in the field production of vegetables. Beside the mentioned species, other weed species are suitable also.

Test crop

For extrapolation of efficacy it does not matter in which crop trials are carried out, as long as the moment of application, assortment of weeds etc. is comparable between the crops. In case of soil herbicides, soil type is an important factor.

POSSIBILITIES OF EXTRAPOLATION

a) Weeds

From:	To:
- specific weed species in a crop	- the same weed species in other crops
- contact herbicide against a weed species (unprotected culture)	- contact herbicide against the same weed species (in protected soil bound culture)
- when trials are carried out with three weed species from the group annual grasses or dicotyledonous	- other weed species from the same group

Extrapolation from one weed species to other weed species is not possible, because of the difference between the sensitivity of the weed species for a herbicide. When trials are carried out with three weed species from the group annual dicotyledonous or annual grasses, extrapolation is possible to the total group. This does not mean that all weeds of this group are susceptible. The susceptible weeds should be mentioned on the label.

In case of a soil herbicide extrapolation from efficacy against weeds in open field crops to an application on trays is not possible. The growing medium is different.

Extrapolation from efficacy against weeds in protected soil bound cultures to unprotected cultures is not possible. Weeds in unprotected cultures are more hardened off and for that reason less susceptible for herbicides. Weed control in protected cultures is hardly ever carried out.

b) Crops

From:	To:
- application of a contact herbicide in a culture with an open field crop e.g. onion, asparagus	- application of the same chemical to a quicker closing crop. Extrapolation the other way around is not possible
- unprotected culture of a specific crop (only contact herbicide)	- protected culture of the same crop (only contact herbicide)

9.40.2 Phytotoxicity

Test crops
Extrapolation from one crop to another is not possible for contact herbicides and soil herbicides. Below some exceptions are given:

From:	To:
- application in protected culture of a specific crop (only contact herbicide)	- application in unprotected culture in the same crop (only contact herbicide)
- pre-emergence, pre-sowing or pre-planting application of one crop (only contact herbicide)	- pre-emergence, pre-sowing or pre-planting application of another crop (only contact herbicide)
- crop on a planting bed	- the same crop on a production field
- cauliflower	- broccoli and vice versa
- red **and** white cabbage	- other head cabbages
- trials in bunched carrots **and** winter carrots	- carrots
- witloof	- chicory
- 1st year set **and** seed onion	- 2nd year set
- seed onion	- seed shallot (and vice versa)
- sown crop	- planted crop
- dwarf snap bean	- other phaeseolus species
- leaf celery	- celeriac
- Florence fennel	- fennel (grown as herb for leaf of seed)

In general sown crops are more susceptible for phytotoxicity in comparison with planted crops. In a number of cases extrapolation from sown crops to planted crops is possible for this reason. Extrapolation from applications in crops on a planting bed or production field to the seed production culture of the same crop is not possible as long as the influence of the product on the seed (e.g. germinal force) is not known.

Extrapolation from applications in unprotected cultures to the protected culture of the same crop is not possible.

10 Vegetable and herb growing (protected culture)

10.1 General

If extrapolation is possible to a group of crops following crops are meant:
- *Cucubitaceae*: gherkin, courgette, cucumber, gourd, melon, patisson, pumpkin and squash
- *Solanaceae*: eggplant, tomato, sweet pepper and Chile pepper
- *Lactuca sativa* spp.: head lettuce, iceberg lettuce, oak-leaf lettuce, Lollo Rosso, Lollo bionda, curled lettuce, leaf lettuce and cos lettuce.

In this chapter only extrapolations are mentioned of the protected culture of vegetables and herbs. When extrapolation to unprotected cultures is possible, it is mentioned explicitly.

10.2 Gummy stem blight, *Mycosphaerella citrullina*

Reference of the extrapolation is the treatment of a crop.

10.2.1 Efficacy

Test organism

- gummy stem blight — *Mycosphaerella citrullina (Didymella bryoniae)*

Test crop

- cucumber

The infection pressure in cucumber is high and the crop is susceptible for infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- cucumber	- other *Cucurbitaceae* (indoor and outdoor)

10.2.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

Cucumber is most susceptible for phytotoxicity of the group *Cucurbitaceae.*

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae (*protected and unprotected culture) and other vegetables with exception of *Lactuca* spp, endive

10.3 Grey mould (crop treatment)

Reference of the extrapolation is the treatment of a crop.

10.3.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckleniana (*former name *Botrytis cinerea)*

Test crop

- tomato (stem infection)
- head lettuce

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- tomato	- other *Solanaceae, Cucurbitaceae,* French bean, runner bean, slicing bean - breeding and seed production of arable and vegetable crops (protected culture)
- head lettuce	- endive, *Lactuca* spp and fresh herbs

Tomato is most susceptible for infection by grey mould of the fruit-vegetables. Most important in tomato is stem infection by grey mould. Research should be done on stem infection of grey mould when tomato is the test crop. From practical experiences is known that if stem infection is controlled well, grey mould will also be good controlled in other fruit-vegetables, French bean, runner bean and slicing bean.

10.3.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

From the group of *Cucurbitaceae* Cucumber is the most susceptible test crop for phytotoxicity. The results can be used for extrapolation to French bean, runner bean, slicing bean and other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- Eggplant

Eggplant is most susceptible for phytotoxicity of the group of *Solanaceae.* On behalf of the area of eggplant a part of the research can be conducted in tomato.

- head lettuce

Head lettuce is more susceptible for phytotoxicity in comparison with iceberg lettuce.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae (*protected and unprotected culture) and other vegetables with exception of *Lactuca* spp and endive - breeding and seed production of arable and vegetable crops (protected culture)
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*
- head lettuce	- endive, *Lactuca* spp and fresh herbs

Extrapolation is not possible from *Cucurbitaceae* to *Solanaceae* or the other way around.

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding culture. So it is necessary to research the influence of the product on the germinal force of the seed.
If there is a lot of (practical) experience that the product has no influence on the germination force of the seed research is not necessary.

10.4 Diseases of germinating plants (crop treatment)

Reference of the extrapolation is the treatment of a crop.

10.4.1 Efficacy

Test organism

- *Pythium* spp

Different fungi can cause diseases of germinating plants. *Pythium* is the most important fungus.

Test crop

- As desired

Pythium can be found in several crops. There is no preference for a certain test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- chosen test crop	- other vegetables in which *Pythium* can be found - breeding and seed production of arable and vegetable crops (protected culture)

10.4.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

From the group of *Cucurbitaceae* Cucumber is the most susceptible test crop for phytotoxicity. The results can be used for extrapolation to French bean, runner bean, slicing bean and other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant

Eggplant is most susceptible for phytotoxicity of the group of *Solanaceae.* On behalf of the area of eggplant a part of the research can be conducted in tomato.

- head lettuce

Head lettuce is more susceptible for phytotoxicity in comparison with iceberg lettuce.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae (*protected and unprotected culture) and other vegetables with exception of *Lactuca* spp and endive - breeding and seed production of arable and vegetable crops (protected culture)
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*
- head lettuce	- endive, *Lactuca* spp and fresh herbs

Extrapolation is not possible from *Cucurbitaceae* to *Solanaceae* or the other way around.

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding culture. So it is necessary to research the influence of the product on the germinal force of the seed.
If there is a lot of (practical) experience that the product has no influence on the germination force of the seed research is not necessary

10.5 Mildew, powdery mildew in *Cucurbitaceae*

Reference of the extrapolation is the treatment of a crop.

10.5.1 Efficacy

Test organism

- powdery mildew — *Sphaerotheca fusca* and /or *S. fuliginea*

Test crop

- cucumber

In cucumber, infection by powdery mildew is a problem.

Note: there are resistant and tolerant varieties. These varieties are not suitable as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- cucumber	- other *Cucurbitaceae (*protected and unprotected culture)

Extrapolation from the protected culture to the unprotected culture is possible. In the protected culture the infection is more severe and more treatments have to be carried out compared to the unprotected culture.

10.5.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

Cucumber is the most susceptible test crop for phytotoxicity of the group *Cucurbitaceae.*

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae (*protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp and endive is not possible.

10.6 Mildew, powdery mildew in Solanaceae

Reference of the extrapolation is the treatment of a crop.

10.6.1 Efficacy

Test organism

- powdery mildew *Leveillula taurica*

This powdery mildew species has another biology in comparison with other powdery mildew species. The mycelium of *Leveillula taurica* is situated in the leaf and the white mycelium is visible on the underside of the leaves. This is in contradiction with other powdery mildew species where the mycelium is found on the outside of the leave.

Test crop

- sweet pepper

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.
Extrapolation to other powdery mildew species is not possible because of the specific way of live.

b) Crops

From:	To:
- sweet pepper	- other Solanaceae where *Leveillula taurica* appears

Sweet pepper is the only crop in the Netherlands where *Leveillula taurica* appears. Other possible host plants are eggplant, Chile pepper and tomato. *Leveillula taurica* is found in tomato in the south of Europe.

10.6.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- eggplant, sweet pepper and tomato

Eggplant is most susceptible for phytotoxicity of the group of *Solanaceae.*
On behalf of the area of eggplant a part of the research can be conducted in tomato. This disease is not found in tomato so in this specific situation a part of the trials can be carried out in sweet pepper. This specific disease does appear in sweet pepper.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- eggplant	- other *Solanaceae*
- eggplant (and sweet pepper)	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*

10.7 Mildew, downy mildew in gherkin and cucumber

Reference of the extrapolation is the treatment of a crop.

10.7.1 Efficacy

Test organism

- downy mildew — *Pseudoperonospora cubensis*

Test crop

- cucumber

Downy mildew can be a problem in this crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- cucumber	- other Cucurbitaceae (protected and unprotected culture)

10.7.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

Cucumber is most susceptible for phytotoxicity of the group of Cucurbitaceae.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other Cucurbitaceae (protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp and endive is not possible.

10.8 Mildew, downy mildew in cauliflower and broccoli

Reference of the extrapolation is the treatment of a crop.

10.8.1 Efficacy

Test organism

- downy mildew — *Peronospora parasitica*

Test crop

- cauliflower
- broccoli

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- cauliflower	- broccoli and the protected culture of breeding and seed production of cabbage crops
- broccoli	- cauliflower and the protected culture of breeding and seed production of cabbage crops

10.8.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- broccoli

The main bud is harvested first. When the tested product comes in contact with the incised wound where the main bud was cut off, phytotoxicity may appear. For that reason broccoli is the most suitable test crop in phytotoxicity trials.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- broccoli	- cauliflower - the protected culture off breeding and seed production of cabbage crops

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germinal force of the seed. Research is not necessary if there is a lot of practical experience that the product has no influence on the germination force of the seed.

10.9 Mildew, downy mildew in herb cultures

10.9.1 Efficacy

Test organism

- downy mildew — *Plasmopara petroselini*

Test crop

- parsley (protected culture)

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- parsley	- parsley, chervil, celery leaves (protected and unprotected culture)

10.9.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- parsley (protected culture)

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- parsley	- parsley, chervil, celery leaves (protected and unprotected culture)

10.10 Mould in endive, head lettuce and iceberg lettuce

Reference of the extrapolation is the treatment of a crop.

10.10.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckeliana*
- stem canker	*Thanatephorus cucumeris*
- sclerotinia blight	*Sclerotinia minor*

Test crop

- head lettuce

Head lettuce is most susceptible for above-mentioned diseases.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible between test organisms and to other organisms.

b) Crops

From:	To:
- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

The number of treatments must be the same.

10.10.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- head lettuce

Head lettuce is most susceptible for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

10.11 Mould in cabbage crops

Reference of the extrapolation is the treatment of a crop.

10.11.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckeliana* (former *Botrytis cinerea*)
- stem canker	*Thanatephorus cucumeris*

Test crop

- Chinese cabbage

Chinese cabbage is susceptible for above-mentioned disease.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible between test organisms and to other organisms.

b) Crops

From:	To:
- Chinese cabbage (grey mould)	- Indian mustard, pak-choi cabbage, kohlrabi, radish and black radish
- Chinese cabbage (stem canker)	- pak-choi cabbage, Indian mustard, radish and black radish

10.11.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- Chinese cabbage
- black radish

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- Chinese cabbage	- Indian mustard, pak-choi cabbage and kohlrabi. There is no expertise about extrapolation from Chinese cabbage to black radish and radish.
- black radish	- radish

10.12 Foot diseases in fruiting vegetables

Reference of the extrapolation is the treatment of a crop.

10.12.1 Efficacy

Test organism

- root rot	*Pythium* spp*. of Pythium aphanidermatum*
- damping-off disease	*Thanatephorus* spp*.* of *Thanatephorus cucumeris*
- foot- and root rot	*Phytophthora* spp. of *Phytophthora capsici*

Test crop

- cucumber (*Pythium* spp*)*
- tomato (*Thanatephorus cucumeris, Phytophthora nicotianae*)

These crops are susceptible for he mentioned diseases.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible between test organisms and to other organisms.

b) Crops

From:	To:
- cucumber	- other fruiting vegetables where *Pythium* spp. appears
- tomato	- other fruiting vegetables where *Thanatephorus cucumeris* respectively *Phytophthora nicotianae* appears

10.12.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
From the group of Cucurbitaceae Cucumber is the most susceptible test crop for phytotoxicity. The results can be used for extrapolation to other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant
From the group of Solanaceae Eggplant is most susceptible test crop for phytotoxicity. On behalf of the area of eggplant a part of the research can be conducted in tomato.

- head lettuce
This crop is the most susceptible test crop for phytotoxicity in compared to iceberg lettuce and endive.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other Cucurbitaceae (protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp and endive is not possible.
- eggplant	- other Solanaceae
- eggplant (and tomato)	- other Solanaceae
- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

10.13 Black leg in cauliflower and broccoli

Reference of the extrapolation is the treatment of a crop.

10.13.1 Efficacy

Test organism

- damping off disease — *Thanatephorus cucumeris*

Test crop

- cauliflower

This crop is susceptible for the above mentioned disease.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- cauliflower	- broccoli

In other protected cultures of cruciferae black leg is not a problem.

10.13.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- broccoli

The main bud is harvested first. When the tested product comes in contact with the incised wound where the main bud was cut off, phytotoxicity may appear. For that reason broccoli is the most suitable test crop in phytotoxicity trials.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- broccoli	- cauliflower

10.14 Aphids (crop treatment)

Reference of the extrapolation is the treatment of a crop.

10.14.1 Efficacy

Test organism

- potato aphid	*Macrosiphum euphorbiae*
- foxglove aphid	*Aulacorthum solani*
- green peach aphid	*Myzus persicae*
- lettuce aphid	*Nasonovia ribisnigri*
- melon or cotton aphid	*Aphis gossypii*
- black bean aphid	*Aphis fabae*

These are the most important aphis species in the protected culture of vegetable crops. Black bean aphid mainly appears in beans.

Stages

Larvae and adults

Test crop

- cucumber

The control of aphids in this crop is difficult because of the big leaves.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- one aphid species	- the same aphid species in other crops
- cotton aphid and two other aphid species	- all aphid species mentioned with test organism

Cotton aphid is the most difficult to control. When a product controls cotton aphid and two other aphid species, extrapolation to all other species is possible.

Extrapolation to the unprotected culture of crops is not possible. The climate circumstances are different and in the unprotected culture of crops infestations may be more severe compared to the protected culture. Extrapolation of efficacy against cotton aphid to the unprotected culture of crops is possible. Cotton aphids only appear in the unprotected culture of crops under particular circumstances.

b) Crops

From:	To:
- cucumber	- other *Cucurbitaceae*, *Solanaceae*, cauliflower (no cabbage aphid), broccoli (no cabbage aphid), Chinese cabbage (no cabbage aphid), French bean, runner bean, slicing bean, fennel, kohlrabi, yard long bean, beet root, Indian mustard, pak-choi cabbage, carrot, turnip tops, radish, black radish, fresh herbs, head lettuce, iceberg lettuce, endive, spinach, lamb's lettuce. - breeding and seed production of arable and

10.14.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Cucumber is most susceptible for phytotoxicity of the group of Cucurbitaceae. Besides that it is a good test crop for other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant
Eggplant is most susceptible for phytotoxicity of the group of Solanaceae. Regarding to the area of eggplant a part of the research can be conducted in tomato.

- head lettuce
This crop is most susceptible for phytotoxicity in comparison with iceberg lettuce and endive.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other Cucurbitaceae (protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp, endive and the protected culture of breeding and seed production of arable and vegetable crops is not possible
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germinal force of the seed. Research is not necessary if there is a lot of practical experience that the product has no influence on the germination force of the seed.

10.15 Leafminers

Reference of the extrapolation is the treatment of a crop.

10.15.1 Efficacy

Test organism

- tomato leafminer	*Liriomyza bryoniae*
- serpentine leafminer	*Liriomyza trifolii*
- pea leafminer	*Liriomyza huidobrensis*

Stages

Larvae

Test crop

- tomato

This crop is susceptible for infestation with leafminers. The infection in tomato is easy to observe. For that reason tomato is a good test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- tomato leafminer	- tomato leafminer in other crops
- serpentine leafminer	- serpentine leafminer, tomato leafminer, pea leafminer and chrysanthemum leafminer in other crops
- pea leafminer	- pea leafminer in other crops

In tomato mainly *Liriomyza. bryoniae, L. trifolii*, *L. huidobrensis* and *Chromatomyia syngenesiae* (chrysanthemum leafminer) appear. *L. bryoniae* en *Chromatomyia syngenesiae* do appear less frequent and are the easiest to control of the four species. Extrapolation from *L. bryoniae* to other *Liriomyza* species is not possible. Extrapolation from *L. trifolii* to both other *Liriomyza* species and *Chromatomyia syngenesiae* is possible. *L. trifolii* appears frequently and is the hardest to control of the four species.

b) Crops

From:	To:
- tomato	- other *Solanaceae*, *Cucurbitaceae*, French bean, runner bean, slicing bean, kohlrabi, radish, black radish, celery, spinach, endive, *Lactuca sativa* spp., yard long bean, Chinese cabbage, blanched celery and fresh herbs

10.15.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Cucumber is most susceptible for phytotoxicity of the group of Cucurbitaceae. Besides that, it is a good test crop for other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant
Eggplant is most susceptible for phytotoxicity of the group of Solanaceae. Regarding to the area of eggplant a part of the research can be conducted in tomato.

- head lettuce
This crop is most susceptible for phytotoxicity in comparison with iceberg lettuce and endive.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae* (protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp and endive is not possible
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*
- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

10.16 Caterpillars

Reference of the extrapolation is the treatment of a crop.

10.16.1 Efficacy

Test organism

- golden twin-spot	*Chrysodeixis chalcites*
- beet armyworm	*Spodoptera exigua*

Test crop

- as desired

Golden twin-spot can be found in several crops. There is no preference for a certain test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- golden twin-spot	- extrapolation to other organisms is not possible
- beet armyworm	- extrapolation to other organisms is not possible

b) Crops

From:	To:
- chosen test crop	- other crops where golden twin-spot and/or beet armyworm appear: protected culture of *Cucurbitacaea*, *Solanacaea*, floriculture crops, nursery crops and all other vegetable crops

10.16.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Cucumber is most susceptible for phytotoxicity of the group of Cucurbitaceae. Besides that it is a good test crop for other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant
Eggplant is most susceptible for phytotoxicity of the group of Solanaceae. Regarding to the area of eggplant a part of the research can be conducted in tomato.

- head lettuce
This crop is most susceptible for phytotoxicity in comparison with iceberg lettuce and endive.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae* (protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp and endive is not possible
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

10.17 Thrips

Reference of the extrapolation is the treatment of a crop.

10.17.1 Efficacy

Test organism

- western flower thrips	*Frankliniella occidentalis*
- *Echinothrips americanus*	*Echinothrips americanus*

Stage

Larvae and adults

Test crop

- sweet pepper
- eggplant

Western flower thrips has a hidden way of live in both crops. Sweet pepper is also a good test crop for Echinothrips.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- western flower thrips	- onion trips (*Thrips tabaci*), rose thrips (*Thrips fuscipennis*)

Extrapolation from Echinothrips to other thrips is not possible.

The thrips mentioned above are the most important species in vegetable crops. The western flower thrips has a hidden way of live and is for that reason hard to control. If western flower thrips can be well controlled, extrapolation is possible to onion thrips and rose thrips. Extrapolation is only possible if trials are carried out in a crop in which the thrips has hidden way of live. Sweet pepper and eggplant are suitable test crops.

E. americanus lives his entire life on the leaves and is as far as we known now less susceptible for pesticides. For that reason separate information of this thrips is needed.

b) Crops

From:	To:
- eggplant	- other *Solanaceae*, *Cucurbitaceae*, French bean, slicing bean, runner bean, yard long bean, radish, black radish, parsley, celery, *Lactuca sativa* spp and endive - breeding and seed production of arable and vegetable crops (protected culture)
- sweet pepper	- other *Solanaceae*, *Cucurbitaceae*, French bean, slicing bean, runner bean, yard long bean, radish, black radish, parsley, celery, *Lactuca sativa* spp and endive - breeding and seed production of arable and vegetable crops (protected culture)

10.17.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Cucumber is most susceptible for phytotoxicity of the group of *Cucurbitaceae.* Besides that it is a good test crop for other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant
Eggplant is most susceptible for phytotoxicity of the group of *Solanaceae*. Regarding to the area of eggplant a part of the research can be conducted in tomato.

- head lettuce
In comparison with iceberg lettuce and endive this crop is more susceptible for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae* (protected and unprotected culture) and other vegetable crops, parsley, celery. Extrapolation to *Lactuca* spp and endive is not possible - the protected breeding and seed production of arable farming- and vegetable crops
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germinal force of the seed. Research is not necessary if there is a lot of expert judgement that the product has no influence on the germination force of the seed.

10.18 Whitefly

Reference of the extrapolation is the treatment of a crop.

10.18.1 Efficacy

Test organism

- silverleaf whitefly — *Bemisia argentifolii (B. tabaci)*

The glasshouse whitefly can also appear in vegetable crops.

Stage

Larvae and adults

Test crop

- eggplant
- cucumber

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- silverleaf whitefly	- silverleaf whitefly and glasshouse whitefly

Extrapolation is possible from silverleaf whitefly to glasshouse whitefly because silverleaf whitefly is hard to control. Therefore proof should be given by a few trials that the product also controls glasshouse whitefly. The results should be good and consistent against both whiteflies.

b) Crops

From:	To:
- eggplant	- protected culture of all other vegetable and herbs - breeding and seed production of arable and vegetable crops (protected culture)
- cucumber	- protected culture of all other vegetable and herbs - breeding and seed production of arable and vegetable crops (protected culture)

Both silverleaf whitefly and glasshouse whitefly are not common in unprotected cultures. They could only be a problem in warm summers and in the neighbourhood of glasshouses. This means that the whiteflies are not in optimum condition and are better to control than in the glasshouses. Extrapolation to the unprotected culture is possible if it is proved that glasshouse whitefly can be well controlled in the protected culture.

10.18.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Cucumber is most susceptible for phytotoxicity of the group of *Cucurbitaceae.* Besides that it is a good test crop for other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant
Eggplant is most susceptible for phytotoxicity of the group of *Solanaceae*. Regarding to the area of eggplant a part of the research can be conducted in tomato.

- head lettuce
This crop is most susceptible for phytotoxicity in comparison with iceberg lettuce and endive.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae* (protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp and endive is not possible - breeding and seed production of arable and vegetable crops (protected culture)
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

- head lettuce	- endive, *Lactuca sativa* spp. and fresh herbs

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germinal force of the seed. Research is not necessary if there is a lot of expert judgement that the product has no influence on the germination force of the seed.

10.19 Spider mites

Reference of the extrapolation is the treatment of a crop. Extrapolation is only possible to the stage of the insect that had been judged.

10.19.1 Efficacy

Test organism

- two spotted spider mite *Tetranychus urticae*

Besides two spotted spider mite, tomato russet mite (*Aculopsi lycopersici*) does also appear in tomato. In eggplant and sweet pepper broad mite (*Polyphagotarsonemus latus)* is a problem. These mites do not belong to the group of spider mites. This extrapolation only concerns spider mites.

Test crop

- eggplant

This crop has big hairy leaves, what makes it difficult to control spider mites.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- two spotted spider mite	- two spotted spider mites in other crops

Extrapolation to tomato russet mite is not possible. Separate trials are needed for this rust mite.

b) Crops

From:	To:
- eggplant	- other *Solanaceae*, *Cucurbitaceae*, French bean, slicing bean, runner bean, yard long bean - breeding and seed production of arable and vegetable crops (protected culture)

Extrapolation from the protected culture of vegetables to the unprotected culture of vegetables is possible also. The spider mite pressure is higher in the protected cultures compared to the unprotected cultures.

10.19.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Cucumber is most susceptible for phytotoxicity of the group of Cucurbitaceae. Besides that, it is a good test crop for other vegetables not belonging to the group of fruit-vegetables with exception of *Lactuca* spp and endive.

- eggplant
Eggplant is most susceptible for phytotoxicity of the group of Solanaceae. Regarding to the area of eggplant a part of the research can be conducted in tomato.

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- cucumber	- other *Cucurbitaceae* (protected and unprotected culture) and other vegetable crops. Extrapolation to *Lactuca* spp and endive is not possible - breeding and seed production of arable and vegetable crops (protected culture)
- eggplant	- other *Solanaceae*
- eggplant (and tomato)	- other *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germinal force of the seed. Research is not necessary if there is a lot of practical experience that the product has no influence on the germination force of the seed.

10.20 Weeds

In the protected culture of vegetables weeds are not a problem. When weeds do cause a problem the extrapolation possibilities are mentioned below. There is no experience of the use of herbicides on artificial substrate.

10.20.1 Efficacy

Test organism

- annual grasses	e.g. annual meadow-grass, Cokspur grass
- annual dicotyledonous	e.g. chickweed, lambsquaters, smartweed
- perennial grasses	e.g. couchgrass
- perennial dicotyledonous	e.g. creeping thistle, Water smartweed

Test crop

For extrapolation of efficacy it does not matter in which crop trials are carried out, as long as time of application, assortment of weeds etc. is comparable between the crops. In case of soil herbicides, soil type is an important factor.

POSSIBILITIES OF EXTRAPOLATION

a) weeds

From:	To:
- specific weed species in a crop	- the same weed species in other crops
- contact herbicide against a weed species (unprotected culture)	- contact herbicide against the same weed species (protected soil bound culture)
- when trials are carried out with three weed species from the group annual grasses or dicotyledonous	- other weed species from the same group

Extrapolation from one weed species to other weed species is not possible, because of the difference between the sensitivity of the weed species for a herbicide. When trials are carried out with three weed species from the group annual dicotyledonous or annual grasses, extrapolation is possible to the total group. This does not mean that all weeds of this group are susceptible. The susceptible weeds should be mentioned on the label.

In case of a soil herbicide extrapolation from efficacy against weeds in soil bound crops to an application on trays is not possible. The growing medium is different.

Extrapolation of efficacy of contact- and soil herbicides is not possible from soil bound or tray treatments to artificial substrate. There are no experiences with herbicides on artificial substrates concerning efficacy.

Extrapolation from efficacy against weeds in protected soil bound cultures to unprotected (soil bound) cultures is not possible. Weeds in unprotected cultures are more hardened off and for that reason less susceptible for herbicides.

b) Crops

From:	To:
- application of a contact herbicide in a culture with an open field crop (e.g. onion or asparagus)	- application of the same plant protection product to a quicker closing crop. Extrapolation the other way around is not possible
- unprotected culture (only contact herbicide)	- protected culture of the same crop (only contact

herbicide)

10.20.2 Phytotoxicity

Test crops
Extrapolation from one crop to another is not possible for contact herbicides and soil herbicides. Below some exceptions are given:

From:	To:
- application in a specific crop in protected culture (only contact herbicide)	- application in the same crop in unprotected culture (only contact herbicide)
- pre-emergence, pre-sowing or pre-planting application of one crop (only contact herbicide)	- pre-emergence, pre-sowing or pre-planting application of another crop (only contact herbicide)
- crop on a planting bed	- the same crop on a production field
- cauliflower	- broccoli
- lettuce	- iceberg lettuce
- sown crop	- planted crop

Extrapolation of selectivity of contact- and soil herbicides is not possible from soil bound or tray treatments to artificial substrate. There are no experiences with herbicides on artificial substrates concerning selectivity.

Extrapolation from applications in crops on a planting bed or production field to the seed production culture of the same crop is not possible as long as the influence of the product on the seed (e.g. germinal force) is not known.

Extrapolation from applications in the unprotected culture to the protected culture of the same crop is not possible.

11 Seed production

11.1.1 Efficacy

Test crop

- growth for crop production

POSSIBILITIES OF EXTRAPOLATION

a) Crops

From:	To:
- regular crop production	- seed production of the same crop

This is the case for fungicides, herbicides and insecticides.

Conditions:
- The control in seed production is the same as in the regular crop production.
- No other requirements of the efficacy of the products will be needed in the seed production than in the regular crop production.
- The methods of treatment do not differ materially from the seed production and the regular crop production.
- The level of infestation does not differ materially from the seed production and the regular crop production, thus there is no expected difference in efficacy.
- Differences in growing season (e.g. other growing season or longer growing season) do not lead to an expected difference in efficacy.
- There are no circumstances that make a treatment of a product in the seed production impossible. An example is poisonous ness for bees. The product is toxic for bees and for a good control the treatment of a product is needed during flowering. No extrapolation is possible from the growth of crop production to the growth of seed production.

11.1.2 Phytotoxicity

Test crops

- Growth of crop production

POSSIBILITIES OF EXTRAPOLATION

From:	To:
- regular production	- seed production of the same crop

This is the case for fungicides, herbicides and insecticides.

Extrapolation is only possible for crop damages like stunting or necrosis.
Conditions mentioned by **Efficacy** should be regarded.

Besides that the crop grown for seed production should not be more sensitive for phytotoxicity than the crop grown for crop production.

It is of great importance that the application of a product does not influence the germinal force of the seed. Extrapolation is not possible from the corresponding culture. So it is necessary to research the influence of the product on the germinal force of the seed.
Research is not necessary if there is a lot of (practical) experience that the product has no influence on the germination force of the seed. For example: research is not necessary for the treatment of products in cereals because on the basis of years of practical experiences it is not expected that products influence the germinal force.

12 Disinfection of seed

12.1 General

12.1.1 Efficacy

In the case of disinfection or treatment of sowing-seed it is the aim to control:

a) seed-borne fungi that can infect the germinating plants or mature plants like bunt in wheat. These diseases will be described as seed-borne diseases.

b) soil fungi that can infect the germinating plants. These diseases will be described as soil diseases.

A very common soil fungus is *Pythium* that can infect many crops. An important specie is *P. ultimum* but other species can also be found.
Besides *Pythium*, *Fusarium* spp. and *Botryotinia* spp. can be found. *Pythium, Fusarium* and *Botryotinia* can be controlled by seed treatments. Another soil fungi, *Thanatephorus cucumeris (Rhizoctonia solani)*, can infect germinating seeds or plants. In general this infection cannot be controlled by a seed treatment.

c) pests
Seed treatments against pests control pests that attack germinating or young plants.

12.1.2 Phytotoxicity

Plant safety research with products used for seed disinfection of treatment should be conducted under (semi) protected conditions. The test crops and possibilities for extrapolation are described in a separate chapter **Phytotoxicity.** The chapter **Phytotoxicity** is based on the protocol for research on phytotoxicity for products used for seed disinfection of seeds for agriculture and horticulture. The Dutch Association for Sowing-seeds and Plant material made this protocol.
The test crops are mentioned in the left column, the extrapolation possibilities are mentioned in the right column.
No or little expert judgement is obtained with extrapolations from the right to the left column. It is mentioned when extrapolation is possible.

Separate phytotoxicity research is needed for crops that are not mentioned in the chapter phytotoxicity.
In the chapter **phytotoxicity** more crops are mentioned compared with the chapter **Efficacy.** For these crops it is possible to extrapolate phytotoxicity but extrapolation is not possible for efficacy. Separate efficacy research is needed for these crops.

12.2 Onion leaf blight

12.2.1 Efficacy

Test organism

- onion *leaf blight* *Botryotinia squamosa*

Test crop

- onions

In principle each onion species with this seed-borne disease can be chosen as a test crop because no onion species is more sensitive for infection compared to another species. On behalf of the area, seed onion will generally be chosen. The onion species are seed onion, first year's onion set, silver skin onion, pickles and spring onions.
Botryotinia squamosa can infect the onions during growing season. A seed treatment cannot control this infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

There are no possibilities for extrapolation.

b) Crops

From:	To:
- test crop	- other onion specie with this seed-borne disease

12.2.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.3 Fusarium culmorum in cereals

12.3.1 Efficacy

Test organism

- *Fusarium culmorum*

Test crop

- winter wheat

The disease can be found in both winter wheat and winter barley but winter wheat will often be infected. Infection is also possible in both spring wheat and spring barley but level of infection is much lower.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

There are no possibilities for extrapolation.

b) Crops

From:	To:
- winter wheat	- winter barley, spring wheat, spring barley, bearded wheat and teff

Extrapolation is also possible from winter barley to winter wheat, spring wheat, spring barley, bearded wheat and teff. For an explanation see Test crop.

12.3.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.4 *Fusarium* spp. in other crops than cereals

12.4.1 Efficacy

Test organism

- *Fusarium* spp.

Test crop

- as desired

Fusarium as a seedborne disease can infect many crops. Any crop can be chosen as a test crop because there are no differences in susceptibility between the crops.
Fusarium as a soil fungus can be controlled by a seed treatment; see chapter **Soil diseases.**
Fusarium can also infect crops during growing season. This infection cannot be controlled by a seed treatment.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- chosen test crop	- other crops with exception of cereals in which *Fusarium* as seed borne disease can be found

In cereals another *Fusarium* spp. can be found. Extrapolation is not possible from *Fusarium* spp. to the specie in cereals. The extrapolation in cereals is mentioned in another section.
Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.4.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.5 Grey mould

12.5.1 Efficacy

Test organism

- grey mould — *Botryotinia fuckeliana* (old name: *Botrytis cinerea)*

Test crop

- as desired

Botryotinia fuckeliana as seed borne disease can be found in many crops. Any crop can be chosen as a test crop because there are no differences in susceptibility between crops.
Botryotinia fuckeliana as a soil fungus can be controlled by a seed treatment; see chapter **Soil diseases.**
Botryotinia fuckeliana can also infect crops during growing season. This infection cannot be controlled by a seed treatment.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- chosen test crop	- other crops in which *Botryotinia fuckeliana* as seed borne disease can be found

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.5.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.6 Black root disease, Aphanomyces cochlioides

12.6.1 Efficacy

Test organism

- black root disease — *Aphanomyces cochlioides*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- sugar beet	- fodder beet and red beet

12.6.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.7 Glume blotch

12.7.1 Efficacy

Test organism

- glume blotch	*Phaeosphaeria nodorum (Stagonospora nodorum, Septoria nodorum)*

Phaeosphaeria nodorum can occur as seed borne disease and can infect crops during growing season. The infection during the growth season cannot be controlled by a seed treatment.

Test crop

- winter wheat

Besides winter wheat the fungi can also infect spring wheat, winter rye, spring rye and triticale. These crops can be chosen as a test crop but in view of the area winter wheat will be often chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- winter wheat	- spring wheat, spring rye, winter rye, spelt and triticale

Extrapolation is also possible from other cereal crops mentioned by test crop; see Test crop.

12.7.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.8 Blackleg

12.8.1 Efficacy

Test organism

- black leg — *Leptosphaeria maculans (Phoma lingam)*

Test crop

- as desired

Leptosphaeria lingam as seed borne disease can be found in following crops: cauliflower, broccoli, Chinese broccoli, kohlrabi, black radish, red cabbage, savoy cabbage, pointed head cabbage, brussels sprouts, white cabbage and rapeseed. Infection in rapeseed is less important than infection of the other crops. Therefore rapeseed is not a suitable test crop. One of the other crops should be chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- chosen test crop	- other crops mentioned by section **Efficacy**

12.8.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.9 Onion neck rot

12.9.1 Efficacy

Test organism

- onion neck rot — *Botrytis aclada*

Test crop

- onion

It is possible to chose any onion species in which neck rot can occur as a test crop because there are no differences in susceptibility between the onion species. On behalf of the area, seed onion will often be chosen as a test crop.
Onion species are: seed onions, 1st year onion set, pickles, silver skin onion and bunched onion.
Botrytis aclada can infect crops during growing season; a seed treatment cannot control this infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- chosen test crop	- other onion species in which *Botrytis aclada* as seed borne disease can occur

12.9.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.10 Leaf spot in beet, *Pleospora betae*

12.10.1 Efficacy

Test organism

- leaf spot — *Pleospora betae (*old name *Phoma betea)*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- sugar beet	- fodder beet, red beet and spinach

12.10.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.11 Grey leaf spots

12.11.1 Efficacy

Test organism

- grey leaf spots — *Pleospora herbarum*

Test crop

- beans (*Phaseolus* spp.) **or**
- peas **or**
- broad bean **or**
- faba bean

Pleospora herbarum can be found in beans (*Phaseolus* spp.), peas, pods, broad beans and faba bean (*Vicia* spp).
One of the test crops can be chosen as a test crop because there are no differences in susceptibility for infection by *Pleospora herbarum* between the crops.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- chosen test crop	- other test crops (see section **Efficacy**)

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.11.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.12 Snow mould

12.12.1 Efficacy

Test organism

- snow mould — *Monographella nivalis (Fusarium nivale)*

Test crop

- winter wheat or winter rye

Infection is most common in winter wheat and winter rye. Infection in winter barley can be found but is of less importance than in winter wheat and winter rye. Infection in spring cereals mentioned can occur but is not important.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- winter rye	- winter wheat, winter barley, spring rye, spring wheat, spring barley
- winter wheat	- winter rye, winter barley, spring rye, spring wheat, spring barley

12.12.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.13 Dark leaf spot

12.13.1 Efficacy

Test organism

- dark leaf spot	*Alternaria brassicae* **and** *Alternaria brassicola*

Test crop

- as desired (see below)

Alternaria brassicae and *Alternaria brassicola* as seed-borne disease can be found in following crops: cauliflower, broccoli, kale, Chinese cabbage, pak-choi, **amsoi**, radish, black radish, red cabbage, savoy cabbage, pointed head cabbage, brussels sprouts and white cabbage. One of these crops should be chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- chosen test crop	- other crops mentioned in section **Efficacy**

12.13.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.14 Common bunt

12.14.1 Efficacy

Test organism

- common bunt — *Tilletia tritici (Tilletia caries)*

Test crop

- winter wheat

Common bunt is less important in spring wheat than in winter wheat.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- *Tilletia tritici*	- *Ustilago hordei* f.sp. *hordei*

From experiences of many years it is known that if a product controls common bunt in wheat well the control of common bunt in barley is also well.

b) Crops

From:	To:
- winter wheat	- spring wheat, winter barley and spring barley

12.14.2 Phytotoxicity

See chapter **Phytotoxicity.**

SOIL FUNGI

12.15 Fusarium spp.

12.15.1 Efficacy

Test organism

- *Fusarium* spp

Test crop

- as desired

Fusarium as a soil fungus can infect germinating seeds and germinating plants of many crops. As far as known there are no differences in susceptibility between the crops. Therefore any crop can be chosen as a test crop.
Fusarium as a seed-borne disease can also be found; see chapter **Seed-borne diseases.**

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- *Fusarium* spp.	- *Fusarium* spp.

From experiences of many years it is known that if a product controls certain *Fusarium* specie it also controls other *Fusarium* spp. as soil fungi that can infect germinating seeds and plants.

b) Crops

From:	To:
- chosen test crop	- other crops in which *Fusarium* spp as a soil fungi can be found

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.15.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.16 Grey mould

12.16.1 Efficacy

Test organism

- grey mould — *Botryotinia fuckeliana (Botrytis cinerea)*

Test crop

- as desired

Botryotinia fuckeliana as a soil fungus can infect germinating seeds and germinating plants of many crops. As far as known there are no differences in susceptibility between the crops. Therefore any crop can be chosen as a test crop.
Botryotinia fuckeliana as a seed-borne disease can also be found; see chapter **Seed-borne diseases.**

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- chosen test crop	- other crops in which *Botryotinia fuckeliana* as a soil fungi can be found

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.16.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.17 Pythium spp.

12.17.1 Efficacy

Test organism

- *Pythium* spp.

Most common is *Pythium ultimum.*

Test crop

- beet **or**
- spinach

With exception of cereals *Pythium* can be infect germinating seeds and plants of many crops. From research experiences it is known that beet and spinach are suitable test crops.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- P*ythium* spp.	- *Pythium* spp.

In general *Pythium ultimum* will be used as test organism. From experiences it is known that extrapolation is possible from *P. ultimum* to other *Pythium* species. It is also known that if a product controls another *Pythium* spp. well it controls *Pythium ultimum* too.

b) Crops

From:	To:
- beet **or** spinach	- other crops in which *Pythium* spp as soil fungi can be found

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.17.2 Phytotoxicity

See chapter **Phytotoxicity.**

PESTS

12.18 Pigmy mangold beetle

12.18.1 Efficacy

Test organism

- pigmy mangold beetle *Atomaria linearis*

Test crop

- sugar beet

Besides sugar beet infection can be found in fodder beet and red beet. Sugar beet is most suitable test crop in view of area and level of sensitive of damage, which depends on sowing density.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- sugar beet	- fodder beet and red beet

12.18.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.19 Bean seed fly

12.19.1 Efficacy

Test organism

- bean seed fly — *Delia platura*

Test crop

- bean

Infection can occur in all *Phaseolus* spp.. Bean is most sensitive for infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation to other organisms is not possible.

b) Crops

From:	To:
- bean	- other bean species (*Phaseolus* spp.)

Extrapolation is not possible from bean species to dwarf snap beans. The change on infection is less in other beans because these beans grow quicker.

12.19.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.20 Leather jacket in cereals and maize

12.20.1 Efficacy

Test organism

- leather jacket - *Tipula* spp.

Test crop

- winter cereal

Infection can occur in all winter cereals and spring cereals and in maize for silage, kernel maize and sweet corn.
Most damage is expected in winter cereals regarding the way of living of the insect. Most damage is expected in autumn. Spring cereals and maize will be sown when leather jackets almost pupate and are less voracious.
On behalf of the area, winter wheat will often be chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- winter cereal	- other cereals and maize for silage, kernel maize and sweet corn

Seeds of maize differ in shape, size and proportions of cereal seeds. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.20.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.21 Frit fly in cereals

12.21.1 Efficacy

Test organism

- frit fly - *Oscinella frit*

Test crop

- winter wheat

Infection can occur in winter barley, winter wheat and winter rye. Regarding the area winter wheat will be often chosen as a test crop.
Infection can also occur in maize. From experiences it is known that extrapolation is not possible from cereal to maize. The other way around is not possible too.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- winter wheat	- winter barley and winter rye

12.21.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.22 Cabbage root fly

12.22.1 Efficacy

Test organism

- cabbage root fly — *Delia brassicae*

Test crop

- cauliflower

Larvae of cabbage root fly causes fall-off plants in the crops cauliflower, broccoli, kale, red cabbage, savoy cabbage cabbage, pointed head cabbage, brussels sprouts and white cabbage. Cauliflower is most sensitive for infection.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- cauliflower	- kale, broccoli, red cabbage, savoy cabbage, pointed head cabbage, brussels sprouts and white cabbage

12.22.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.23 Spotted millepede in beet

12.23.1 Efficacy

Test organism

- spotted millepede - *Blaniulus guttulatus*

Test crop

- sugar beet

Besides sugar beet, infection can occur in fodder beet and red beet. On behalf of the growing area sugar beet is most suitable as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- sugar beet	- fodder beet and red beet

12.23.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.24 Wireworm in maize and cereals

12.24.1 Efficacy

Test organism

- wire worms — *Agriotes* spp.

Test crop

- maize

Infection can occur in maize (for silage, kernel and sweet corn) and all cereals (winter cereals and spring cereals).
Maize is most sensitive for infection because of the biology of the insect and the sowing density (maize smaller compared to cereals).
On behalf of the growing area silage maize will often be chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- maize	- other maize species and cereals

Seeds of cereals differ in shape, size and proportions of maize seeds. Therefore extrapolation is only possible if dose rate on test crop is the same as dose rate on other crops.

12.24.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.25 Wheat bulb fly

12.25.1 Efficacy

Test organism

- wheat bulb fly — *Delia coarctata*

Test crop

- winter wheat

Infection can occur in winter barley, winter wheat and winter rye. On behalf of the growing area winter wheat is most suitable as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- winter wheat	- winter barley and winter rye

12.25.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.26 Springtail

12.26.1 Efficacy

Test organism

- spring tail — *Onychiurus armatus*

Test crop

- sugar beet

Besides sugar beet infection can occur in fodder beet and red beet. Sugar beet is most suitable as a test crop regarding growing area and susceptibility for damage, which depends on sowing density. Also other wheat bulb flies of the genus *Collembola* can occur. However *Onychiurus armatus* is most important specie that is very common.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

From:	To:
- *Onychiurus armatus*	- *Collembola* spp.

b) Crops

From:	To:
- sugar beet	- fodder beet and red beet

12.26.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.27 Onion fly in onion species and leek

12.27.1 Efficacy

Test organism

- onion fly — *Delia antiqua*

Test crop

- seed onion **or**
- silver skin onion **or**
- pickles **or**
- leek (bed of plants)

Infection by larvae of onion fly can controlled by a seed treatment in the crops seed onion, 1st year onion set, silver skin onion, pickles, seed shallots and leek on beds of plants.
Regarding growing area seed onion is most suitable as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) Test organism

Extrapolation is not possible to other organisms.

b) Crops

From:	To:
- a test crop	- other crops mentioned as test crop

12.27.2 Phytotoxicity

See chapter **Phytotoxicity.**

12.28 Phytotoxicity

Test organism

From:	To:
- sugar beet	- fodder beet, red beet, spinach beet
- maize for silage	- sweet corn, kernel maize
- sweet corn	- maize for silage, kernel maize
- winter barley	- spring barley, oat
- spring barley	- winter barley, oat
- winter wheat	- spring wheat, winter rye, spring rye, triticale, spelt
- spring wheat	- winter wheat, winter rye, spring rye, triticale, spelt
- peas, dry harvesting	- pod, garden pea and other P*isum sativa* spp.
- seed onion	- 1st year onion set, silver skin onion, pickles, seed shallot, bunched onion, chives, Chinese chives, leek
- 1st year onion set	- seed onion, silver skin onion, pickles, seed shallot, bunched onion, chives, Chinese chives, leek
- silver skin onion	- seed onion, 1st year onion set, pickles, seed shallot, bunched onion, chives, Chinese chives, leek
- pickles	- seed onion, 1st year onion set, silver skin onion, seed shallot, bunched onion, chives, Chinese chives, leek
- seed shallot	- seed onion, 1st year onion set, silver skin onion, pickles, bunched onion, chives, Chinese chives, leek
- leek	- seed onion, 1st year onion set, silver skin onion, pickles, seed shallot, bunched onion, chives, Chinese chives
- English ryegrass	- Italian rye grass, smooth-stalked meadow grass, red fescue, *Lolium* spp., *Agrostis* spp, *Phalaris* spp, *Phleum arenarium* and other grass species
- lupin, blue	- lupin yellow and white
- white clover	- other *Trifolium* species, black medick, white sweet clover, *Lotus* spp, lucerne
- poppy seed	- no possibilities for extrapolation
- flax	- no possibilities for extrapolation
- buckwheat	- no possibilities for extrapolation
- tomato	- egg plant, sweet pepper, Chile pepper
- gherkin	- cucumber, Courgette, pumpkin, melon, water melon
- spinach	- lamb's lettuce
- heading lettuce	- all *Lactuca* species, dandelion salad
- whiteloof	- chirory, endive, cardoon, sugar loaf and red-leaved chicory
- spring carrot	- winter carrot, celery, celeriac, blanched celery, fennel, parsley, caraway, dill and wild carrot
- winter carrot	- spring carrot, celery, celeriac, blanched celery, fennel, parsley, caraway, dill and wild carrot
- radish	- black radish, wild radish

- cauliflower	- broccoli, red cabbage, white cabbage, pointed head cabbage, savoy cabbage, brussels sprouts, Chinese cabbage, kohl rabi, kale, Indian mustard, pak-choi, turnip, rapeseed (incl. summer rapeseed), Swedes, Swedish turnip, *Brassica napus* spp., *Brassica rapa* var. *rapa,* crambe, *Sinapsis alba*
- dwarf snap bean	- dwarf slicing bean, pole snap bean, pole slicing bean, dwarf french bean (*Phaseolus vulgaris* spp.), runner bean, broad bean (*Vicia faba* spp.), common vetch, hairy vetch