EXTRAPOLATION DOCUMENT

POSSIBILITIES FOR THE EXTRAPOLATION OF EFFICACY AND CROP SAFETY DATA OF PLANT PROTECTION PRODUCTS.

Version 3.0 March 2019

Preface

The extrapolation document ‘Possibilities for the extrapolation of efficacy and crop safety data of plant protection products’ has been available since 1999. At that time, the Netherlands Food and Consumer Product Safety Authority (NVWA), formerly the Plant Protection Service, compiled the document based on extrapolation possibilities as used in NVWA recommendations on the agronomic adequacy of products, authorisation decisions of the Ctgb and knowledge and experience from applied research and interest groups. The extrapolation document has been regularly updated by the NVWA and the Ctgb, with new extrapolation possibilities added for specific pests or diseases, minor crops crops and starting material. In addition, textual changes have been made, so that the terms used correspond to those in the definition lists[1] of the Ctgb.

The extrapolation document was amended in 2019 because a new extrapolation document has been developed for ornamental crops (see the document “Possibilities for extrapolation of efficacy and phytotoxicity of plant protection products for ornamental crops”)
Combining this file with the current extrapolation document is not practical due to differences in approach and format. Instead, reference is made to this external document in chapters for which this is relevant.

[1] Definition list, legal conditions for use [DTW] Category: Plant protection products; version 2.1. June 2015

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1 GENERAL

1.1 Introduction

Objective:

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

Scope

The extrapolation possibilities of the efficacy and phytotoxicity data of plant protection products (PPPs) for controlling insects, mites, fungi, weeds and nematodes in agricultural and horticultural crops have been identified, and this update focuses especially on minor crops.
Only the most common and/or important weeds, pests and diseases are involved in the extrapolation options because these are the only topics on which expertise exists.

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.
The general principle for the extrapolations indicated is that the same substance is used (same formulation, dosage). Case-specific conditions for extrapolation are given in the lists.
The extrapolation lists indicate the possibilities for extrapolation of the product to a different organism or to a different crop. In order to make an extrapolation, one has to contemplate the whole system of plant protection product - target organism(s) - crop. The following aspects are relevant:

- 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 (herbaceous, woody, perennial, etc.)
- The characteristics of the target organisms should be taken into account (e.g. hidden behaviour)
- When extrapolation is performed on a crop, the product used for controlling the pests, diseases or weeds must be applied in the same way as in the original test crop (application time, application method, application frequency, etc.).
- The most sensitive crop should be used as test crop if any difference in sensitivity between crops is known to exist.
- Comparative damage in the tested crop/pest, disease and/or weed combination and the extrapolated crop should not differ.
- Cropping systems and circumstances of the crops should be taken into account (e.g. unprotected or protected crops, use of irrigation)
- Account should be taken of soil type whenever it is known that this has an effect on efficacy (e.g. certain crops grown on sandy soil are more susceptible to damage from soil herbicides or the mangold beetle than those grown on clay soil). If this effect is known, it is only possible to extrapolate from crops grown on similar soils. This is for instance relevant for soil herbicides, soil treatments, such as granular formulations, wet soil sterilisation products and and tuber infection by *Phytophthora infestans*..

- If different stages of the target organism can cause damage, there should be no difference between the test crop and the extrapolated crop in respect to sensitivity to these different stages.

The final decision as to whether extrapolation can be deployed between crops and/or pests or diseases for a specific use lies with the Ctgb and must be taken on the basis of the relevant application and dossier.

Status of this document

Extrapolations agreed at European level can be found in the EPPO extrapolation tables. Not all extrapolations in the present (Dutch) extrapolation document have been included in these EPPO tables; these have therefore not been harmonised at the European level. Nevertheless, it is possible to request the extrapolations described here or other extrapolations based on expert judgement in zonal dossiers, provided that a valid substantiation is provided.
The preparation and updating of EPPO extrapolation tables is an ongoing process. The goal is to have more extrapolations included in the EPPO extrapolation tables in the future.

The extrapolations in the extrapolation document are a representation of the extrapolation possibilities used in:
- Decisions taken by the Board for the Authorisation of Plant Protection Products and Biocides (Ctgb).
- Advice given by the NVWA and its predecessor to the Ctgb in the context of preparing recommendations on the agronomic adequacy of products that have been submitted for authorisation.
- Recommendations given to businesses by the NVWA.
- Consultation with other departments of the NVWA.
- Consultation with experts from research institutes and other stakeholders.

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 in this area.

1.2 Method

The possibilities for extrapolation 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)
- tree nursery crops and perennials
- edible mushrooms
- fruit growing
- Vegetables and herbs (unprotected)
- Vegetables and herbs (protected)

The possibilities for extrapolation of seed treatments have also been determined.

Extrapolations specifically connected to a particular product are not included in this document.

Definition of protected culture/unprotected culture

Protected culture:	Crops grown under glass or plastic where there is no continuous open contact with the atmosphere. Crops grown in covered spaces 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 continuous open contact with the atmosphere.

The extrapolation lists are structured according to these crop groups.
Within every crop (or crop group) a second level is used, based on the target organism.
Every chapter has sections on efficacy and 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 test 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 the underlying considerations are also 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 standard test crop.

Sub b) A list of standard test crops is presented which are included in the phytotoxicity research.
As far as possible, explanatory remarks are included.
Under the heading “extrapolation possibilities” it is indicated to which crops extrapolation of phytotoxicity research is possible from the standard test crop.

In making a choice of standard test 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 production area of standard test crop should be reasonably large. In dealing with a very small production area 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 the pest occurs very commonly and the crop is also sensitive to pesticides. Wherever this has been done it has been indicated in the list.
In floriculture, arboriculture, flower bulbs, bulb and tuber flowers and perennial ornamental plants, all crop groups usually consist of a many 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 user to make a small-scale field test first.

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

1.3 Extrapolation between crops

In the individual extrapolation lists a number of possible extrapolations between different crops are presented.

1.3.1 Efficacy

For extrapolations between crops the same conditions as described under 1.1 apply. “Conditions for use of the extrapolation lists”.

1.3.2 Harmful effects

Conditions for the extrapolation between crops 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 chance of tuber infection is higher on those typesw 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 potatoes	- starch potato and seed potato

Extrapolation is not possible from starch potato and seed potato to ware potato because the number of treatments is higher in ware potatoes.
For controlling potato late blight, the highest demands are placed on products used on ware potatoes, partly in view of the large production area of the Bintje cultvar. For these reasons, good insight into how products work can only be obtained from studies on ware potatoes.

2.1.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- ware potatoes

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- ware potatoes	- starch potato and seed potato

Based on practical experience, extrapolation of phytotoxicity is possible from ware potato to starch potato and seed potato.

2.2 Leaf and ear diseases in wheat

The extrapolation concerns a crop treatment.

2.2.1 Efficacy

Test organism

- leaf and ear diseases	- powdery mildew *(Erysiphe graminis* f.sp*. tritici) on leaf and ear* - 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 other fungi. Based on practical experience it is known that if *Mycosphaerella graminicola* can be well controlled, *Leptosphaeria nodorum* (leaf infection) can also be well controlled. A few trials on *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. Data should also be provided for fungi that can damage both the leaf and the ear, e.g. mildew and Mycosphearella. Powdery mildew (leaf infection), yellow rust and brown rust can infect wheat both earlier and later in the growing season. Extrapolation is possible from the treatment early in the season to the treatment later in the 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 disease pressure 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 their susceptibility to infection is lower.

2.2.2 Phytotoxicity

Can be determined 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 the susceptibility of teff for plant protection products is not known.

2.3 Leaf blotch/scald in barley

The extrapolation concerns a crop treatment.

2.3.1 Efficacy

Test organism

- leaf blotch - *Rhynchosporium secalis*

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 disease pressure or susceptibility.

2.3.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

2.4.1 Efficacy

Test organism

- *Cercospora*	*Cercospora beticola*
- *Ramularia*	*Ramularia beticola*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- *Cercospora*	- *Cercospora beticola*
- *Ramularia*	- *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 the production area of sugar beet is much larger than that of 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 determined 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 concerns a crop treatment.

2.5.1 Efficacy

Test organism

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

This refers to powdery mildew that causes leaf infection in early in the growing season. Powdery mildew that 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 (leaf and ripening disease) 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 disease pressure 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 disease pressure is lower.

2.5.2 Phytotoxicity

Can be determined 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 the susceptibility of teff for plant protection products is not known.

2.6 Mildew, powdery mildew in barley

The extrapolation concerns a crop treatment.

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 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 disease pressure or susceptibility for infection.

2.6.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

2.7.1 Efficacy

Test organism

- powdery mildew — *Erysiphe graminis (Blumeria graminis)*

Test crop

- Kentucky bluegrass
or
- English ryegrass
or
- red fescue

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism

Extrapolation is not possible to other organisms.

b) Crops

from:	to:
- Kentucky bluegrass	- English ryegrass and red fescue
- English ryegrass	- Kentucky bluegrass and red fescue
- red fescue	- English ryegrass and Kentucky bluegrass

Extrapolation is possible between these crops because no differences exist in disease pressure or susceptibility.

2.7.2 Phytotoxicity

Extrapolation is possible for the direct effect on the crop. Extrapolation is not possible for the effects on the germinating capacity of the seed.

Test crops

- Kentucky bluegrass
or
- English ryegrass
or
- red fescue

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Kentucky bluegrass	- English ryegrass and red fescue
- English ryegrass	- Kentucky bluegrass and red fescue
- red fescue	- field meadow and English ryegrass

This extrapolation is only possible for crop reactions that can be observed directly and not for the effects on the germination potential and yield of seed.

2.8 Net blotch in barley

The extrapolation concerns a crop treatment.

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 disease susceptibility is lower in spring barley.

2.8.2 Phytotoxicity

Can be determined 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. In contrast to efficacy, extrapolation for phytotoxicity is possible from spring barley to winter barley.

2.9 Rust, brown rust in wheat

The extrapolation concerns a crop treatment.

2.9.1 Efficacy

Test organism

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

Brown rust causes infection in earlier in the growing season. Brown rust can also cause infection in later in the growing season; these leaf and ear diseases are 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 disease pressure 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 disease pressure is lower.

2.9.2 Phytotoxicity

Can be determined 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 the susceptibility of teff for plant protection products is not known.

2.10 Rust, brown rust in barley

The extrapolation concerns a crop treatment.

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 there are no differences in disease pressure.

2.10.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

2.11.1 Efficacy

Test organism

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

Yellow rust causes infection early in the growing season. It can also cause infection later stage in the growing season; these leaf and ear diseases are described in Section 2.2.

Test crop

- winter wheat

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- yellow rust	- yellow rust as one of the leaf and ear diseases

b) crops

from:	to:
- winter wheat	- spring wheat, triticale, spelt and teff

Extrapolation is not possible from spring wheat to winter wheat because the disease pressure is lower in spring wheat.
Extrapolation is possible from winter wheat to triticale because the disease pressure is lower in triticale, spelt, and teff.

2.11.2 Phytotoxicity

Can be determined 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 the susceptibility of teff for plant protection products is not known.

2.12 Rust, yellow rust in barley

The extrapolation concerns a crop treatment.

2.12.1 Efficacy

Test organism

- yellow rust — *Puccinia striiformis* f.sp. *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 disease pressure or susceptibility for infection.

2.12.2 Phytotoxicity

Can be determined 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 Rusts in grass seed cultivation

The extrapolation concerns a crop treatment.

2.13.1 Efficacy

Test organism

- black rust	*Puccinia graminis* subsp. *graminicola*
or	
- crown rust	*Puccinia coronata* sp. *coronata*
or	
- brown spot rust	*Puccinia brachypodii* sp. *poa-nemoralis*
or	
- meadow grass rust	*Puccinia poarum*

Test crop

- English ryegrass (for black stem rust and crown rust)
- Kentucky bluegrass (for meadow grass rust and brown spot rust)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- black rust	- crown rust, brown spot rust and meadow grass rust
- crown rust	- black rust, brown spot rust and meadow grass rust
- brown spot rust	- black rust, crown rust and meadow grass rust
- meadow grass rust	- black rust, crown rust and brown spot rust

b) crops

from:	to:
- English ryegrass	- Kentucky bluegrass and red fescue
- Kentucky bluegrass	- English ryegrass and red fescue

2.13.2 Phytotoxicity

Extrapolation is only possible for determining the harmful effects on the crops. These effects can be determined in the efficacy trials.
Extrapolation is not possible for the effects on the germination potential of the seed.

Test crops

- Kentucky bluegrass

or

- English ryegrass

or

- red fescue

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Kentucky bluegrass	- English ryegrass and red fescue

- English ryegrass
- Red fescue
- Kentucky bluegrass and red fescue
- field meadow and English ryegrass

This extrapolation is only possible for crop reactions that can be observed directly and not for the effects on the germination potential and yield of seed.

2.14 Aphids in potato (sucking damage)

The extrapolation concerns a crop treatment.

2.14.1 Efficacy

Test organism

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

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

Test crop

- ware potatoes
or
- starch 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 the buckthorn aphid is more difficult to control than the green peach aphid, it is unknown whether efficacy of products can be extrapolated to the green peach aphid. It is known that that the control of green peach aphid can **not** be extrapolated to the buckthorn aphid.

Other aphids can cause sucking damage too. It is not known whether extrapolation from the green peach aphid or buckthorn aphid to these other aphid species is possible. Besides the buckthorn aphid, in recent years *Aphis frangulae* has also caused substantial damage in the autumn. This species is closely related to the cotton aphid also infests buckthorns. Possibilities for extrapolation are not known.

b) crops

from:	to:
- ware potatoes	- starch potatoes
- starch potatoes	- ware potatoes

Extrapolation is only possible from starch 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 the 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 be conducted in seed potatoes.

2.14.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- ware potatoes
or
- starch potato

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- ware potatoes	- starch potatoes
- starch potatoes	- ware potatoes

2.15 Aphids in potato (False top roll)

The extrapolation concerns a crop treatment.

2.15.1 Efficacy

Test organism

- potato aphid *Macrosiphum euphorbiae*

Test crop

- ware potatoes
or
- starch potato

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation to other organisms is not possible.

The potato aphid is mentioned separately because the assessment method differs from the method used in other aphids. Assessments are based on the symptoms of the crop and should not be done by counting the number of aphids.

b) crops

from:	to:
- ware potatoes	- starch potatoes
- starch potatoes	- ware potatoes

Potato aphid should be controlled around mid June. Therefore no special conditions have to be considered for extrapolation from starch potato to ware potato. Potato aphid is not relevant for seed potato.

2.15.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- ware potatoes
or
- starch potato

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- ware potatoes	- starch potatoes
- starch potatoes	- ware potatoes

2.16 Aphids in beets (sucking damage)

The extrapolation concerns a crop treatment.

2.16.1 Efficacy

Test organism

- black bean aphid *Aphis fabae*

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

No expert judgement is available for extrapolation from fodder beet to sugar beet or red beet. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.16.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sugar beet	- fodder beet, red beet

2.17 Aphids in beets (virus transmission)

The extrapolation concerns a crop treatment.

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

b) crops

from:	to:
- sugar beet	- fodder beet

No expert judgement is available for extrapolation from fodder beet to sugar beet. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet.

2.17.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sugar beet	- fodder beet

2.18 Aphids in cereals (sucking damage)

The extrapolation concerns a crop treatment.

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 whether barley is a suitable test crop or not. Till now research has often been conducted in wheat and mostly 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	- springwheat, triticale, spelt and teff winter and spring barley
- spring wheat	- winter wheat, winter and spring barley

2.18.2 Phytotoxicity

Can be determined 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 the susceptibility of teff for plant protection products is not known.

2.19 Potato stem borer in beet

The extrapolation concerns a crop treatment.

2.19.1 Efficacy

Test organism

- potato stem borer - *Hydraecia micacea*

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

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 the crop production area of sugar beet is much larger than the crop production area of fodder beet.

2.19.2 Phytotoxicity

Can be determined 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 is not possible to other organisms.

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. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.20.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

2.21.1 Efficacy

Test organism

- flea beetle - *Phyllotreta* spp.

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

No expert judgement is available for extrapolation from fodder beet and red beet to sugar beet. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.21.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

2.22.1 Efficacy

Test organism

- pigmy mangold beetle - *Atomaria linearis*

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

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.22.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sugar beet	- fodder beet, red beet

2.23 Collembola

The extrapolation concerns a crop treatment.

2.23.1 Efficacy

Test organism

- collembola - *Onychiurus armatus*

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

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.23.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

2.24.1 Efficacy

Test organism

- beet fly *Pegomya betae*

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

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.24.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

2.25.1 Efficacy

Test organism

- mangold flea beetle *Chaetocnema concinna*

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

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because the crop production area of sugar beet is much larger than the crop production area of fodder beet.

2.25.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sugar beet	- fodder beet

2.26 Colorado beetle

The extrapolation concerns a crop treatment.

2.26.1 Efficacy

Test organism

- Colorado beetle - *Leptinotarsa decemlineata*

Test crop

- ware potato
or
- starch potato
or
- seed potato

EXTRAPOLATION POSSIBILITIES

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- ware potato	- starch potato and seed potato
- starch potato	- ware potato and seed potato
- seed potato	- ware potato and starch potato

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
- starch potato
or
- seed potato

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- ware potatoes	- starch potato and seed potato
- starch potato	- ware potato and seed potato
- seed potato	- ware potato and starch potato

2.27 Beet carrion beetle

The extrapolation concerns a crop treatment.

2.27.1 Efficacy

Test organism

- beet carrion beetle *Aclypea opaca*

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

No expert judgement is available for extrapolation from fodder beet to sugar beet. In general research will be conducted in sugar beet because the crop production area of sugar beet is much larger than the crop production area of fodder beet.

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2.27.2 Phytotoxicity

Can be determined 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 is not possible to other organisms.

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. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.28.2 Phytotoxicity

Can be determined 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 concerns a crop treatment.

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 (further indication cannot be specified at this time)

No expert judgement is available 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. It can be expected that research will be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet.

2.29.2 Phytotoxicity

Can be determined 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 - *Thrips angusticeps*

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

No expert judgement is available for extrapolation from fodder beet or red beet to sugar beet. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.30.2 Phytotoxicity

Can be determined 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 is not possible to other organisms.

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. It can be expected that research will usually be conducted in sugar beet because the crop production area of sugar beet is larger than that of fodder beet or red beet.

2.31.2 Phytotoxicity

Can be determined 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 organism

group:

- 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. couch grass
- perennial dicotyledonous	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

For extrapolation of the effect, in principle it does not matter in which crop the effect is tested, as long as the time of application, cultivation method, cultivation duration, degree of soil cover by the crop, types of weeds, etc. are 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, if the conditions are met
- if trials are carried out with at least three weed species, from different families in the group of annual grasses or the group of dicotyledonous species.	- other weed species of the same group

Extrapolation is not possible from one weed species to another because susceptibility to herbicides of weed species can be different. However, if the effect is tested against at least 3 weed species of different families, for example from the group of annual dicotyledonous species or grasses, it is possible to extrapolate to the total group. But this does not mean that all weed species from that group will be sensitive. Susceptible weeds should always be stated on the label. For perennial dicotyledonous weeds and perennial grasses, extrapolation to the group is not possible. These weeds are very specific and therefore for each species 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 closes 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.

EXTRAPOLATION POSSIBILITIES

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 contact-acting herbicides)
- seed potato	- ware potato and starch potato extrapolation is not possible the other way around due to the high demands on seed potato and the shorer growth period of seed potato
- ware potato	- starch potato, extrapolation is not possible the other way around because the growth period of ware potato is shorter
- sugar beet	- fodder beet
- fodder beet	- sugar beet
- winter barley	- winter wheat
- spring barley	- spring wheat extrapolation the other way around is not possible because spring barley can be more sensitive
- forage maize	- grain maize
- grain maize	- forage maize
- Italian ryegrass	- English ryegrass Extrapolation is not possible the other way around because Italian ryegrass can be more susceptible for herbicides
- witloof chicory roots	- large rooted chicory
- broad beans	- other *Vicea* speciesExtrapolation is not possible the other way around because broad beans can be more sensitive to herbicides
- dwarf French bean	- other *Phaseolus* speciesExtrapolation is not possible the other way around because dwarf French beans can be more sensitive to herbicides.
- green pea	- other *Pisum* speciesExtrapolation is not possible the other way around because garden peas can be more sensitive to herbicides
- sheep’s fescue	- red fescue the other way around is not possible because sheep’s fescue can be more sensitive

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 these four crops, extrapolation is possible to winter barley, triticale, spring wheat and spelt. Extrapolation is not possible to teff because the susceptibility of teff for plant protection products is not known.

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

Maize

The yield of forage maize is the yield of the whole plant. The yield of grain maize is the grains only. If the yield of grain maize is good, this means that the whole plant grew well. This data can be extrapolated to forage maize on the condition that the yields of several trials have been consistent.

3 FLOWER BULB AND FLOWER TUBER CROPS

The extrapolation possibilities for floriculture are detailed in the document “Possibilities for extrapolation of efficacy and phytotoxicity of plant protection products for ornamental crops”

4 FLORICULTURE

The extrapolation possibilities for floriculture are detailed in the document “Possibilities for extrapolation of efficacy and phytotoxicity of plant protection products for ornamental crops”

5 TREE NURSERY CROPS AND PERENNIAL CROPS

The extrapolation possibilities for floriculture are detailed in the document “Possibilities for extrapolation of efficacy and phytotoxicity of plant protection products for ornamental crops”

6 EDIBLE MUSHROOMS

6.1 General

No herbicides are permitted in the culture of edible mushrooms. Consequently there is no expertise on this topic. Possibilities of extrapolation of herbicides are unknown at this time.

6.2 Bubble fungi

6.2.1 Efficacy

Test organism

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

Test crop

- button mushroom

POSSIBILITIES OF EXTRAPOLATION

a) test organism

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

b) crops

Extrapolation to other edible mushrooms, such as oyster mushrooms, is not possible. There are too many differences in timing of use and cultivation methods to make extrapolation possible. Moreover little expertise is available in other species of edible mushrooms besides the button mushroom.

6.2.2 Mycotoxicity

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

6.3 Gall midges

6.3.1 Efficacy

Test organism

- gall midge (larvae stadium) *Mycophila speyeri*

This species is most common.

Test crop

- button 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, such as oyster mushrooms, is not possible. There are too many differences in timing of use and cultivation methods to make extrapolation possible. Moreover little expertise is available in other species of edible mushrooms besides the button mushroom.

6.3.2 Mycotoxicity

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

6.4 Mites

6.4.1 Efficacy

Test organism

- common storage mite — *Tyrophagus putrescentiae*

Test crop

- button 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, such as oyster mushrooms, is not possible. There are too many differences in timing of use and cultivation methods to make extrapolation possible. Moreover little expertise is available in other species of edible mushrooms besides the button mushroom.

6.4.2 Mycotoxicity

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

7 FRUIT CROPS

7.1 General

Extrapolation is restricted to unprotected cultures with the exception of thrips in protected cultures. The protected culture of fruit crops is limited to a small production 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 apple and pear production.
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. This is because *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

The extrapolation concerns a crop treatment.

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	- currant (red, black currant and white currant), gooseberry, cherry and pear
- black currant	- currant (red, black and white currant), gooseberry, cherry and pear
- gooseberry	- currant (red, black and white currant), cherry and pear
- white currant	- currant (red, black and white currant), gooseberry, cherry and pear

7.2.2 Phytotoxicity

For red currant, black currant, white currant and gooseberry, phytotoxicity can be determined in the efficacy tests. Black, white and red currant are more susceptible for phytotoxicity than 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	- currant (red, black and white currant) and gooseberry
- black currant	- currant (red, black and white currant) and gooseberry
- white currant	- currant (red, black and white currant) and gooseberry
- sweet cherry	- sour cherry

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

7.3 Leaf- and stem diseases

The extrapolation concerns a crop treatment.

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	- Blackberry and raspberry family (*Rubus* spp.)
- raspberry	- Blackberry and raspberry family (*Rubus* spp.)

7.3.2 Phytotoxicity

Can be determined in the efficacy tests, assuming that extrapolation from blackberry to raspberry is not possible because raspberry is more susceptible for phytotoxicity. if the efficacy trials are conducted in blackberry, separate phytotoxicity trials need to be conducted in raspberry.

Test crops

- raspberry

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- raspberry	- Blackberry and raspberry family (*Rubus* spp.)

7.4 Grey mould (Botrytis fruit rot)

The extrapolation concerns a crop treatment.

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) a) test organism

There are no possibilities for extrapolation from grey mould to other organisms.

b) crops

from:	to:
- strawberry (unprotected culture)	- strawberry (protected culture), berries, grapes, blackberry and raspberry family (Rubus spp.), plum, pear and cherry

7.4.2 Phytotoxicity

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Test crops

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

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- strawberry (protected culture)	- strawberry (unprotected culture)
- red currant **or** white currant **or** black currant	- currant (red, black currant and white currant) and gooseberry
- raspberry	- Blackberry and raspberry family (Rubus spp.)
- 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 than the test crops.

7.5 Shot hole disease

The extrapolation concerns a crop treatment.

7.5.1 Efficacy

Test organism

- shot hole disease *Stigmina carpophila*

Test crop

- cherry (preference sweet cherry)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible from shot hole disease to other organisms.

b) crops

from:	to:
- cherry	- stone fruit (cherry, plum, apricot, peach)

7.5.2 Phytotoxicity

Can be determined 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	- stone fruit (cherry, plum, apricot, peach)

7.6 Mildew, powdery mildew

The extrapolation concerns a crop treatment.

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 grapes - *Sphaerotheca apahanis* (powdery mildew) in for example strawberry

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

b) crops

from:	to:
- apple	- pome fruit (apple, pear, quince and common medlar) and fruit tree cultivation and fruit tree stocks of pome fruit
- gooseberry	- small fruit (strawberry, berries, blackberry and raspberry family (Rubus spp.) and grapes)
- strawberry (preference shelf cultivation)	- strawberry (protected culture), red currant, white currant, black currant, blackberry, raspberry and grapes

7.6.2 Phytotoxicity

Extrapolation is possible from currant (red or white or black currant) to gooseberry.
Extrapolation is possible from raspberry to the blackberry and raspberry family (Rubus spp.) 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, separate phytotoxicity studies are required or phytotoxicity can be determined in the efficacy tests.
When russetting is found in trials conducted in apple and pear production, but no symptoms on the leaf or negative influences on the growth are found, extrapolation to fruit tree cultures and fruit tree stocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple
- red currant **or** black currant or white currant
- pear
- raspberry
- strawberry (protected culture)

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- red currant or white currant or black currant	- currant (red, black and white currant) and gooseberry
- raspberry	- Blackberry and raspberry family (Rubus spp.)
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear

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

7.7 Scab

The extrapolation concerns a crop treatment.

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 carpophila)* in peach and plum - scab *(Venturia cerasi)* in cherry - scab *(Venturia pirina)* in pear

b) crops

from:	to:
- apple	- pome fruit (apple, pear, quince and common medlar) and stone fruit (cherry, peach, apricot and plum) and fruit tree cultivation of pome fruit, Japanese crab apple (ornamental crop)

7.7.2 Phytotoxicity

Can be observed for apple 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops
- apple
- pear
- sweet cherry

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sweet cherry	- stone fruit (sour cherry, peach, apricot and plum)
- apple	- fruit tree cultures and fruit tree stocks of apple

- pear	- fruit tree cultures and fruit tree stocks of pear

7.8 Brown rot

The extrapolation concerns a crop treatment.

7.8.1 Efficacy

Test organism

- brown rot *Monilia laxa*

Test crop

- cherry (sour)

or

- plum

N.B. 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*)

N.B. Fruit rot is a common disease in sweet cherry.

b) crops

from:	to:
- sour cherry	- stone fruit (cherry, peach, apricot and plum)
- plum	- stone fruit (cherry, peach, apricot and plum)

7.8.2 Phytotoxicity

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

Test crops

- sweet cherry

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sweet cherry	- stone fruit (cherry, plum, peach and apricot)

7.9 Fruit tree canker

The extrapolation concerns a crop treatment.

7.9.1 Efficacy

Test organism

- fruit tree canker	*- Nectria galligena*

Test crop

- apple
-

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- apple	- pome fruit (apple, pear, quince and common medlar) and fruit tree cultivation and fruit tree stocks of pome fruit

7.9.2 Phytotoxicity

Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and other parameters are used to assess 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures.
N.B. For the crop used in the efficacy tests, phytotoxicity can be determined in the efficacy tests.

Test crops
- apple **and** pear

POSSIBILITIES OF EXTRAPOLATION

- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple **and** pear	- pome fruit and fruit tree cultures and fruit tree stocks of pome fruit

Extrapolation to other crops is not possible.

7.10 Aphids

The extrapolation concerns a crop treatment.

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 difficult to control.

Test crop

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

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- rosy apple aphid	- apple-grass aphid *(Rhopalosiphum insertum), currant stem aphid (Rhopalosiphoninus ribesinus),* anthriscus aphid (*Dysaphis anthrisci),* green peach aphid *(Myzus persicae),* rosy leaf-curling aphid *(Dysaphis devecta* and *D. anthrisci),* pear aphid *(Dysaphis pyri), Anuraphis farfarae*, black bean aphid *(Aphis fabae), Melanaphis pyaria*, green apple aphid *(Aphis pomi),* blackberry grass aphid *(Sitobion fragariae)*, large blackberry aphid *(Amphorophora rubi)*, permanent blackberry aphid (*Aphis ruborum),* small 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)*, Blackcurrant aphid *(Aphis schneideri),* peach aphid *(Hyalopterus amygdali),* mealy plum aphid *(Hyalopterus pruni)*, cherry aphid *(Myzus cerasi)*
- currant blister aphid	- currant blister aphid *(Cryptomyzus ribis)*

- green apple aphid	- blackberry grass aphid *(Sitobion fragariae),* large blackberry aphid *(Amphorophora rubi),* small blackberry aphid *(Aphis ruborum),* small raspberry *aphid (Aphis idaei)*, currant stem aphid *(Rhopalosiphoninus ribesinus)*, green peach aphid *(Myzus persicae)*, black bean aphid *(Aphis fabae), Melanaphis pyaria*, large raspberry aphid *(Amphorophora rubi).*
- 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	- pome fruits (apple, pear, quince, medlar), currant (black, red and white currant), blueberry, gooseberries, blackberry and raspberry family (Rubus spp.), stone fruit (cherry, peach, plum and apricot) and fruit tree cultivation of apple and pear
- red currant	- currant (red, black and white currant), gooseberries and blueberry
- strawberry (protected culture)	- strawberry (unprotected culture)

Extrapolation from apple or red currant to strawberry is not possible, because different aphids occur on strawberry that are difficult to control.

7.10.2 Phytotoxicity

Phytotoxicity can be determined in the efficacy tests in strawberry, apple and red currant. Extrapolation is possible from red currant to black currant, white currant 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 is possible from raspberry to the blackberry and raspberry family (Rubus spp.) because raspberry is more susceptible for phytotoxicity.
Extrapolation is possible from cherry to stone fruit (peach, cherry, apricot) and plum. Sweet cherry has the preference because it is more susceptible for phytotoxicity in comparison with sour cherry.
Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and other parameters are used to assess 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple **and**
- pear

- sweet cherry
- red currant
- raspberry

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sweet cherry	- stone fruit (cherry, peach, apricot and plum)
- red currant or white currant or black currant	- currant (red, white currant and black currant) and gooseberry
- raspberry	- Blackberry and raspberry family (Rubus spp.)
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear

7.11 Tortrix moth

The extrapolation concerns a crop treatment.

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	- pome fruit (apple, pear, quince and common medlar)
- fruit growing cultures	- tree nursery crops, perennials and amenity areas

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 other parameters
are used to assess phytotoxicity.
Phytotoxicity in apple can be determined in the efficacy tests.

Test crops

apple and pear

POSSIBILITIES OF EXTRAPOLATION

Extrapolation to other crops is not possible.

- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

7.12 Psyllids

The extrapolation concerns a crop treatment.

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 is 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 crops

- 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: damage by pear psylla is more common than damage by apple leaf sucker, and apple leaf sucker is more susceptible for pesticides. There are no differences in biology between these species that would prevent extrapolation.

b) crops

from:	to:
- pear	- Pome fruit (pear, apple, quince en medlar)

7.12.2 Phytotoxicity

Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and other parameters are used to assess 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures. Phytotoxicity in pear can be determined in the efficacy tests.

Test crops

apple **and** pear

POSSIBILITIES OF EXTRAPOLATION

- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear

- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

Extrapolation to other crops is not possible.

7.13 Leafhoppers

The extrapolation concerns a crop treatment.

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 that occur 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 stocks of apple
- apple	- raspberry and fruit tree cultures and fruit tree stocks of apple

7.13.2 Phytotoxicity

Phytotoxicity can be determined 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 stocks 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 and raspberry family (Rubus spp.)
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

7.14 Fruit moth

The extrapolation concerns a crop treatment.

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	- pome fruit (apple, pear, quince and common medlar) and plum
- fruit growing cultures	- tree nursery crops, perennials and amenity areas

7.14.2 Phytotoxicity

Can be observed for apple in the efficacy tests. Extrapolation from apple to pear and plum is not possible. Separate 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 other parameters are used to assess 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- apple and pear
- plum

POSSIBILITIES OF EXTRAPOLATION

- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

Extrapolation to other crops is not possible.

7.15 Gall midges

The extrapolation concerns a crop treatment.

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 major differences in the biology of black currant leaf midge, apple leaf curling midge and pear leaf curling midge. For that reason extrapolation between these species is possible. Extrapolation is only possible in case of a systemic-acting product. Only these types of products can control the leaf midges sufficiently because they live inside 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 major differences in biology between these three species and black currant leaf midge. There are also mutual differences between these three species. Mutual extrapolation for efficacy is therefore not possible.

b) crops

from:	to:
- red currant **or** black currant **or** white currant	- pome fruit (apple, pear, quince and common medlar) currant (red, white and black currant) and gooseberry

7.15.2 Phytotoxicity

For red, white and black currant, phytotoxicity can be determined 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 other parameters are used to assess 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** white currant **or** black currant	- currant (red currant, white currant en black currant) and gooseberry
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

7.16 Weevils

The extrapolation concerns a crop treatment.

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 beetle.

b) crops

from:	to:
- strawberry	- blackberry and raspberry

In small fruit, more species of weevils occur. These are either not important or extrapolation is not possible, except in a few cases.

7.16.2 Phytotoxicity

Phytotoxicity in strawberry can be determined 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 it is more susceptible for pesticides than blackberry.

Test crops

- raspberry

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- raspberry	- Blackberry and raspberry family (Rubus spp.)

7.17 Caterpillars of the clearwing

The extrapolation concerns a crop treatment.

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	- currant (red, black and white currant) and gooseberry, fruit tree cultures and fruit tree stocks of apple

7.17.2 Phytotoxicity

Can be observed for apple in the efficacy tests. Extrapolation from apple to red currant, white currant or black currant and gooseberry is not possible. These crops require separate phytotoxicity trials. Red, white or black currant 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

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

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- red currant **or** white currant **or** black currant	- currant (red, black and white currant) and gooseberry
- apple	- fruit tree cultures and fruit tree stocks of apple

7.18 Caterpillars of winter moth and clouded drab moth

The extrapolation concerns a crop treatment.

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 **or** pear	- pome fruits (apple, pear, quince and medlar) and stone fruits (cherry, plum, peach and apricot) and blueberry
- apple and pear	- tree nursery crops, perennials and public parks or landscaping;

7.18.2 Phytotoxicity

Phytotoxicity in apple and pear can be determined 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 than plum and sour cherry.
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 between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and other parameters are used to assess 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 stocks 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	- stone fruits (cherry, apricot, peach and plum)
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

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 currant, white currant 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 major differences in the biology of the oystershell scale and the *Quadraspidotus ostreaformis*.
The differences that do exist do not affect extrapolation.

b) crops

from:	to:
- apple	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit.

7.19.2 Phytotoxicity

Can be observed for apple in the efficacy tests. Extrapolation from apple to pear and vice versa is not possible. There are differences in sensitivity for phytotoxicity between these crops and other parameters are used to assess 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

apple **and** pear

POSSIBILITIES OF EXTRAPOLATION

- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear

- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

Extrapolation to other crops is not possible.

7.20 Thrips (protected culture)

The extrapolation concerns a crop treatment.

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 have hidden behaviour and are therefore the most difficult 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 and raspberry family (Rubus spp.) grapes, peach (protected culture)

7.20.2 Phytotoxicity

Phytotoxicity in strawberry can be determined in efficacy trials. Extrapolation from strawberry to blackberry, raspberry, grapes and peach is not possible. These crops require separate phytotoxicity trials. If the research is conducted on raspberry, then extrapolation can be made to blackberry and raspberry family (Rubus spp.). Raspberry is more susceptible to phytotoxicity than blackberry. Extrapolation from grapes and peach is not possible to other crops mentioned in this section. These crops require separate phytotoxicity trials.

Test crops
- raspberry

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- raspberry	- Blackberry and raspberry family (Rubus spp.)

7.21 Bugs

The extrapolation concerns a crop treatment.

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	- torch bug *(Campylomma verbasci),* black apple bug *(Atractotomus mali)*

b) crops

from:	to:
- apple **or** red currant	- pome fruits (apple, pear, quince, medlar), currant (black, red and white currant), gooseberry, blackberry and raspberry family (Rubus spp.), strawberry, fruit tree cultivation and fruit tree stocks of apple and pear.

7.21.2 Phytotoxicity

Phytotoxicity for apple and pear can be determined in the efficacy tests. Extrapolation can be done 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 other parameters are used to assess 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 stocks 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** white currant **or** black currant	- currant (red currant, white currant en black currant) and gooseberry
- raspberry	- Blackberry and raspberry family (Rubus spp.)
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

7.22 Mites, bud mites

The extrapolation concerns a crop treatment.

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	- currant (red, white and black currant), gooseberry and hazel

7.22.2 Phytotoxicity

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

Test crops

- black currant
- hazel

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- black currant	- currant (red, black and white currant) and gooseberry

7.23 Mites, rust mites

The extrapolation concerns a crop treatment.

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 **or** pear	- pome fruit (apple, pear, quince and common medlar), plum and raspberry

Extrapolation of plum rust mite is possible from pear to tree nursery crops in which plum rust mite occurs.

7.23.2 Phytotoxicity

Phytotoxicity in apple and pear can be determined in the efficacy tests. Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and other parameters are used to assess phytotoxicity. When efficacy trials are conducted in apple, phytotoxicity for apple can be determined and 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 stocks 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 and raspberry family (Rubus spp.)
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

7.24 Mites, spider mites

The extrapolation concerns a crop treatment.

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 grapes (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)	- pome fruit (apple, pear, quince, medlar), stone fruit (cherry, plum, peach and apricot), currant (red, black and white currant), gooseberries, blackberry and raspberry family (Rubus spp.), grapes, strawberry
- apple (European red mite)	- pome fruit (apple, pear, quince, medlar), stone fruit (cherry, plum, peach and apricot), currant (red, black and white currant), fruit tree cultures and fruit tree stocks of apple and pear.
- red **or** white **or** black currant **or** blackberry **or** raspberry (gooseberry red spider mite)	- currant (red, black and white currant), gooseberry, blackberry and raspberry family (Rubus spp.)

Extrapolation of two-spotted spider mite is possible from tree nursery crops and ornamental crops to fruit crops in which two-spotted spider mite occurs. Extrapolation for European red mite is possible

from fruit crops to tree nursery crops and perennials and to public parks or landscaping in which European red mite occurs.

7.24.2 Phytotoxicity

Phytotoxicity can be partly determined 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, however in some cases extrapolation is possible.

Extrapolation between apple and pear is not possible. There are differences in sensitivity for phytotoxicity between these crops and other parameters are used to assess 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 stocks of apple and pear is possible. Russetting is not an issue in these cultures.

Test crops

- raspberry
- sweet cherry
- red currant
  or black currant
  or white currant
- strawberry

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- sweet cherry	- stone fruit (cherry, peach, apricot and plum)
- raspberry	- Blackberry and raspberry family (Rubus spp.)
- red currant **or** white currant **or** black currant	- currant (red, black and white currant) and gooseberry
- strawberry (protected culture)	- strawberry (unprotected culture)
- apple	- fruit tree cultures and fruit tree stocks of apple
- pear	- fruit tree cultures and fruit tree stocks of pear
- apple and pear	- Pome fruit (apple, pear, quince and common medlar) and fruit tree cultures and fruit tree stocks of pome fruit

Extrapolation from apple, pear and grapes 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 currant, white currant or black currant to blueberry.

7.25 Weeds

7.25.1 Efficacy

Test organism

group:	
- annual grasses	e.g. annual meadow grass, barnyard grass, black grass or wind grass
- annual dicotyledonous weeds	e.g. common chickweed, common groundsel, field speedwell
- perennial grasses	e.g. couch grass
- perennial dicotyledonous and other perennial weeds	e.g. creeping thistle, amphibious bistort, common horsetail

Weeds mentioned are common species in the cultivation of fruit crops. Beside the mentioned species, other weed species are also suitable as test weeds.

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

POSSIBILITIES OF EXTRAPOLATION

Weeds

from:	to:
- specific weed species in a crop	- the same weed species in other crops
- use of contact herbicide against a type of weed in unprotected soil-bound cultivation	- contact herbicide against the same weed species (protected soil-bound culture)
- if trials are carried out with at least three weed species from the groups of annual grasses or dicotyledonous weeds	- other weed species from the same group, only applies to annual weeds

Extrapolation from one weed species to other weed species is not possible in principle due to differences between the herbicide sensitivity of the weed species . However, if trials are conducted with at least three weed species from the group annual dicotyledonous weeds or annual grasses, the total group that includes these species can be stated on the label. However, this does not mean that all weeds of this group are susceptible. The susceptible weeds should always be stated on the label.

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. Weed control in protected crops is hardly ever conducted.

Crops

from:	to:
- one crop	- all other fruit crops
- apple	- wind breaks, fruit tree cultures and fruit tree stocks of apple and pear

The effect against weeds in soil-bound cultivation cannot be extrapolated to the use in non-soil-bound cultivation (in pots) if it concerns a soil herbicide.

Regarding the efficacy of contact herbicides and soil herbicides, extrapolation is not possible from soil-bound culture to culture on artificial substrate (e.g. strawberries on peat bags or water), to the extent weed control is used in these cultivation methods.
For efficacy there is no experience with the use of herbicides on artificial substrate.

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	- currant (white, red and black currant) and gooseberry
- raspberry	- blackberry and raspberry family (Rubus spp.)
- recently planted crops (only for soil-acting herbicides)	- established planting of the same crop (only for soil-acting herbicides)
- raspberry or blackberry (protected culture)	- raspberry or blackberry (unprotected culture)
- strawberry (culture of runner plants)	- strawberry production culture or selection fields, extrapolation the other way around is also possible
- tree nursery of the same crops which are used as wind breaks	- wind breaks

Extrapolation from other *Ribes* 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 currant, white currant 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 apple and pear production to fruit tree cultures and fruit tree stocks of apple and pear is not possible. No expertise is available on this extrapolation.

8 CULTIVATED GRASSLAND

8.1 Weeds

8.1.1 Efficacy

Test organism

Groups:	
- annual grasses	e.g. annual meadow grass
- annual dicotyledonous weeds	e.g. common chickweed, red dead-nettle, shepherd's purse
- perennial grasses	e.g. couch grass
- perennial dicotyledonous species	e.g. creeping thistle, broad-leaved dock, big nettle, dandelion, common buttercup

The weeds mentioned above are common species in grassland. Beside the mentioned species, other weed species are also suitable as test weeds.

Test crops
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. In case of soil herbicides, soil type is an important factor.

POSSIBILITIES OF EXTRAPOLATION

Weeds

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 species research is required.

Crops

from:	to:
- application of herbicide on young fodder grassland	- application of the same product on existing fodder grassland, the reverse is not possible

Extrapolation is not possible from one weed species to another because susceptibility to herbicides of weed species can be different. However, if trials are carried out with at least three weed species from the group annual dicotyledonous weeds or annual grasses from different families, the total group to which these weeds belong can be stated on the label. However, this does not mean that all weeds of this group are susceptible. The susceptible weeds should always be stated on the label. This does not include perennial dicotyledonous weeds. These are so different that separate research is required for each species.

8.1.2 Phytotoxicity

Test crops

The mixtures used for grassland consist mainly or exclusively of English ryegrass.
In addition to English ryegrass, various mixtures include other types of grass, such as timothy grass, meadow fescue and Kentucky bluegrass. All mixtures for grassland can also contain white clover.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- young fodder grassland of a certain mixture	- existing fodder grassland of approximately the same mixture

9 VEGETABLE AND HERB GROWING (UNPROTECTED CULTURE)

9.1 General

This chapter refers to extrapolation between vegetable crops in unprotected cultures. When extrapolation to protected cultures is possible, this is stated specifically.
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 brassica vegetables.
If 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 brassica vegetables is claimed. Chinese cabbage has preference above the other crops. When good results are found in Chinese cabbage, extrapolation to the total group of brassica vegetables is possible. Herbicides require separate phytotoxicity trials. The possibility of phytotoxic reactions in herbicide trials is greater and the consequences (especially the economic consequences) are also greater in comparison to insecticide and fungicide trials.
Head cabbages include red cabbage, yellow and green savoy cabbage, head cabbage, white cabbage.
Latuca sativa spp. refers to the following species of lettuce: curled leaf lettuce, baby leaf, oak leaf lettuce, Lollo rosso, head lettuce, iceberg lettuce, Roman lettuce, Lolla bionda, Batavia

9.2 Leaf spot diseases, black spot

The extrapolations involve a crop treatment.

9.2.1 Efficacy

Test organism

- leaf spot diseases, black spot	*Alternaria brassicae* *Alternaria brassicicola*	or

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	- flowering brassicas (cauliflower and broccoli), leafy brassicas (curly kale and Chinese cabbage), head cabbages (head cabbage and Brussels Sprouts) and ornamental cabbage (floriculture crop) - protected culture of breeding and seed production of brassica vegetables. In protected cultures, more spraying may be needed or may need to be repeated more often. This aspect should be taken in account in the assessment of each product.

9.2.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- Chinese cabbage

Chinese cabbage is more susceptible for phytotoxicity than other brassicas because it lacks the wax layer present in these crops.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Chinese cabbage	- flowering brassicas (cauliflower and broccoli), leafy brassicas (curly kale and Chinese cabbage), head cabbages (head cabbage and Brussels Sprouts) and ornamental cabbage crops (ornamental crop) - extrapolation to protected breeding and seed production of brassica vegetables is not possible.

The phytotoxicity for protected plant breeding and seed production is extrapolated from the protected breeding of ornamental crops or vegetable crops.

9.3 Leaf spot diseases, ring spot disease

The extrapolations involve a crop treatment.

9.3.1 Efficacy

Test organism

- leaf spot diseases, ring spot disease *Mycosphaerella brassicicola*

Test crop

- Brussels sprouts
- amsoi
- pak-choi

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- Brussels sprouts	- flowering brassicas (cauliflower and broccoli), curly kale, head cabbages (head cabbage and Brussels sprouts), and ornamental cabbage (ornamental crop)
- amsoi	- flowering brassicas (cauliflower and broccoli), curly kale, head cabbages (head cabbage and Brussels Sprouts), pak-choi, and ornamental cabbage crops (floriculture crop)
- pak-choi	- flowering brassicas (cauliflower and broccoli), curly kale, head cabbages (head cabbage and Brussels Sprouts), amsoi, and ornamental cabbage (floriculture crop)
- amsoi or pak-choi	- protected breeding and seed production of brassica vegetables In protected cultures, more spraying may be needed or may need to be repeated more often. This aspect should be taken in account in the assessment of each product.

Extrapolation from Brussels sprouts to amsoi and pak-choi cabbage is not possible. Compared to Brussels Sprouts these crops need a higher level of control.

9.3.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- Brussels sprouts
- amsoi
- pak-choi
- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Brussels Sprouts	- Head cabbages (head cabbage and Brussels Sprouts)
- amsoi	- flowering brassicas (cauliflower and broccoli), curly kale, head cabbages (head cabbage and Brussels Sprouts), pak-choi, and ornamental cabbage crops (floriculture crop)
- pak-choi	- flowering brassicas (cauliflower and broccoli), curly kale, head cabbages (head cabbage and Brussels Sprouts), amsoi, and ornamental cabbage (floriculture crop)
- Chinese cabbage	- flowering brassicas (cauliflower and broccoli), leafy brassicas (curly kale and Chinese cabbage), head cabbages (head cabbage and Brussels Sprouts) and ornamental cabbage (floriculture crop)

Extrapolation to protected breeding and seed production of brassica vegetables is not possible.

The phytotoxicity for protected plant breeding and seed production is extrapolated from the protected breeding of ornamental crops or vegetable crops.

9.4 Leaf spot diseases, *Phoma lingam*

The extrapolations involve a crop treatment.

9.4.1 Efficacy

Test organism

- Leaf spot diseases *Phoma lingam*

Test crop

- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- Chinese cabbage	- amsoi and pak-choi

Phoma lingam causes leaf spots only in Chinese cabbage, amsoi and pak-choi. *Phoma lingam* does not cause leaf spots in other types of cabbage.

9.4.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- Chinese cabbage
Chinese cabbage is more susceptible for phytotoxicity than other brassicas because it lacks the wax layer present in these crops.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Chinese cabbage	- flowering brassicas (cauliflower and broccoli), leafy brassicas (curly kale and Chinese cabbage), head cabbages (head cabbage and Brussels sprouts) and ornamental cabbage crops (ornamental crop)

9.5 Leaf spot diseases, *Septoria apiicola*

The extrapolations involve a crop treatment.

9.5.1 Efficacy

Test organism

- leaf spot diseases *Septoria apiicola*

Test crop

- celery

Celery is susceptible to infection. Because no disease damage is allowed, the level of control must be very high.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- celery	- celeriac, parsley, chervil and leaf celery

9.5.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- celery

Celery is more susceptible to phytotoxicity than celeriac.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- celery	- celeriac, parsley, chervil and leaf celery

9.6 Leaf spot diseases in bulb vegetables (onions, shallots and spring onions)

The extrapolations involve a crop treatment.

9.6.1 Efficacy

Test organism

- leaf spot diseases *Botrytis squamosa*

Test crop

- first-year bulb onion

Because of the high density of the crop canopy, bulb onion is the most susceptible to infection.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- first-year bulb onion	- bulb vegetables (seed onion, second-year bulb onion, silverskin onion, pickling onion, seed shallot and bulb shallot, spring onion and garlic). - protected breeding and seed production of onions. In protected cultures, more spraying may be needed or may need to be repeated more often. This aspect should be taken in account in the consideration of each product.

9.6.2 Phytotoxicity

Can be determined in the efficacy tests. There are no differences in sensitivity to phytotoxicity between the various onion and shallot species.

Test crops

- first-year bulb onion

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- first-year bulb onion	- bulb vegetables (seed onion, second-year bulb onion, silverskin onion, pickling onion, seed shallot and bulb shallot, spring onion and garlic).

Extrapolation to protected breeding and seed production of onions is not possible.

The phytotoxicity for protected plant breeding and seed production is extrapolated from the protected breeding of floriculture crops or vegetable crops.

9.7 Chocolate spot disease, *Botrytis fabae*

The extrapolations involve a crop treatment.

9.7.1 Efficacy

Test organism

- Chocolate spot disease *Botrytis fabae*

Test crop

- broad bean

The requirements for the control in broad bean are higher than those in field bean.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- broad bean	- field bean

9.7.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- broad bean

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- broad bean	- field bean

9.8 Grey mould and *sclerotinia sclerotiorum* blight in pulses

The extrapolations involve a crop treatment.

9.8.1 Efficacy

Test organism

- grey mould *Botryotinia fuckeliana*
- *Sclerotinia sclerotiorum*

Test crop

- dwarf French bean

Of all pulses the dwarf French bean is most susceptible to infection by both grey mould and *sclerotinia sclerotiorum*.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation between the two fungi is not possible.

b) crops

from:	to:
- dwarf French bean	- beans with pod (dwarf French bean, climbing French bean, scarlet runner bean, slicing bean, climbing slicing bean, *phaseolus vulgaris*, Lima bean, and asparagus bean) and mangetout

9.8.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- dwarf French bean

There are no differences in sensitivity to phytotoxicity between the various pulses.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- dwarf French bean	- bean with pod (dwarf French bean, climbing French bean, scarlet runner bean, slicing bean, climbing slicing bean, *phaseolus vulgaris*, Lima bean, and asparagus bean) and mangetout

9.9 Clubroot in cabbage

The extrapolations involve a soil treatment.

9.9.1 Efficacy

Test organism

- clubroot *Plasmodiophora brassicae*

Test crop

- cauliflower
- broccoli

Both crops are susceptible for infection.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cauliflower or broccoli	- flowering brassicas (broccoli and cauliflower), head cabbage, curly kale and amsoi and pak-choi

9.9.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- cauliflower
- broccoli
- Chinese cabbage

Chinese cabbage is more susceptible for phytotoxicity than other brassicas because it lacks the wax layer present in these crops.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cauliflower or broccoli	- flowering brassicas (broccoli and cauliflower), curly kale, head cabbage
- Chinese cabbage	- flowering brassicas (broccoli and cauliflower), leafy brassicas (curly kale and Chinese cabbage) and head cabbages (head cabbage and Brussels Sprouts)

9.10 Neck rot in bulb vegetables (onions, shallots and spring onions)

The extrapolations involve a crop treatment.

9.10.1 Efficacy

Test organism

- crown rot *Botrytis aclada*

Test crop

- first-year bulb onion

Because of the high density of the crop canopy first-year bulb onion sets are most susceptible to infection. Moreover, first-year bulb onions require the most control.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- first-year bulb onion	- bulb vegetables (seed onion, second-year bulb onion, silverskin onion, pickling onion, seed shallot, bulb shallot, spring onion, and garlic).

9.10.2 Phytotoxicity

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

Test crops

- first-year bulb onion

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- first-year bulb onion	- bulb vegetables (seed onion, second-year bulb onion, silverskin onion, pickling onion, seed shallot and bulb shallot, spring onion and garlic).

9.11 Alternaria leaf blight in carrots

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 (non-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 its development. *Alternaria dauci* is especially a problem at the end of the season due to the volume of the foliage, which remains damp for a long time (structure of the crop, dense canopy). Therefore efficacy trials are recommended in carrots that will be harvested in September or October. Winter carrot has a high risk of infection due to the volume of foliage. For this reason winter carrot is preferred as test crop. Besides the volume of foliage, there are higher demands for controlling alternaria leaf blight in winter carrot. Winter carrot is stored after harvest, and storing carrots infected with alternaria leaf blight can cause problems during storage.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- winter carrot	- carrots

9.11.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- - winter carrot (non-disinfected seed)

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- winter carrot	- carrots

9.12 Mildew, powdery mildew in brassica vegetables

The extrapolations involve a crop treatment.

9.12.1 Efficacy

Test organism

- powdery mildew *Erysiphe cruciferarum*

Test crop

- Brussels sprouts
- cauliflower
- broccoli

Powdery mildew occurs in these crops.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- one of the test crops mentioned above	- flowering brassicas, head cabbages and curly kale. - protected breeding and seed production of brassica vegetables. In protected cultures, more spraying may be needed or may need to be repeated more often. This aspect should be taken in account in the assessment of each product.

9.12.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- cauliflower
- broccoli
- Brussels sprouts
- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- broccoli	- flowering brassicas, head cabbages, and curly kale
- cauliflower	- flowering brassica, head cabbages, and curly kale
- Brussels Sprouts	- head cabbages and curly kale
- Chinese cabbage	- brassica vegetables (flowering brassicas, head cabbages and leafy brassica)

Extrapolation to protected breeding and seed production of brassica vegetables is not possible.

The phytotoxicity for protected plant breeding and seed production is extrapolated from the protected breeding of floriculture crops or vegetable crops.

9.13 Mildew, downy mildew in lettuce (*Lactuca* spp.)

The extrapolations involve a crop treatment.

9.13.1 Efficacy

Test organism

- lettuce downy mildew *Bremia lactucae*

Test crop

- head lettuce

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

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- head lettuce	- lettuce (*Lactuca* spp.)

The number of treatments must be the same.
Extrapolation from unprotected cultures to protected cultures is possible. Infections in unprotected cultures are usually more severe than infections in protected cultures.

9.13.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- head lettuce

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- head lettuce	- *Lactuca* spp. and endive.

Head lettuce has thin leaves and is therefore more susceptible for phytotoxicity compared to types such as iceberg lettuce, which has thicker and harder leaves. Other lettuce varieties have similar leaf structures to iceberg lettuce. Head lettuce can serve as a model for other lettuce varieties.

9.14 Mildew, downy mildew in bulb vegetables (onions, shallots and spring onions)

The extrapolations involve a crop treatment.

9.14.1 Efficacy

Test organism

- onion downy mildew *Peronospora destructor*

Test crop

- first-year bulb onion
- seed onion

The dense structure of the crop canopy makes first-year bulb onion the most susceptible to infection.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- first-year bulb onion or seed onion	- bulb vegetables (seed onion, second-year bulb onion, silverskin onion, pickling onion, bulb shallot, seed shallot, spring onion and garlic).

9.14.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- first-year bulb onion

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

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- first-year bulb onion	- bulb vegetables (seed onion, second-year bulb onion, silverskin onion, pickling onion, bulb shallot, seed shallot, spring onion and garlic).

9.15 Mildew, downy mildew in flowering Brassica and head cabbages

The extrapolations involve a crop treatment.

9.15.1 Efficacy

Test organism

- onion downy mildew *Peronospora parasitica*

Test crop

- broccoli on plant beds
- cauliflower on production field

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- broccoli on plant beds	- plant bed of flowering brassicas and head cabbages
- cauliflower on production field	- production field of flowering brassicas and head cabbages

Downy mildew is not a problem in other brassica vegetables.

9.15.2 Phytotoxicity

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

Test crops

- broccoli on production field

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- broccoli	- flowering brassicas, curly kale and head cabbages

9.16 Leaf spot diseases (leek white tip) in leek and bulb vegetables (onions, shallots and spring onions)

The extrapolations involve a crop treatment.

9.16.1 Efficacy

Test organism

- leaf spot diseases (leek white tip) *Phytophthora porri*

Test crop

- leek
- second-year bulb onion

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

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- leek	- onions and shallots
- second-year bulb onion	- onions and shallots

In other onion crops leek white tip is not a problem.

9.16.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- second-year bulb onion

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- second-year bulb onion	- onions and shallots

There is no difference in sensitivity to phytotoxicity between the various onion types and shallots, therefore extrapolation to all onion types is possible. No extrapolation is possible between leek and onion, because the habitus of the crops differ too much.

9.17 Rust, white rust in brassica vegetables

The extrapolations involve a crop treatment.

9.17.1 Efficacy

Test organism

- white rust *Albugo candida*

Test crop

- Brussels sprouts
- cauliflower
- broccoli

White rust is a common disease in these crops.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- one of the test crops mentioned above	- flowering brassicas, head cabbages, curly kale and radishes - protected breeding and seed production of brassica vegetables. In protected cultures, more spraying may be needed or may need to be repeated more often. This aspect should be taken in account in the assessment of each product.

9.17.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- broccoli
- cauliflower
- Brussels sprouts
- small radish or black radish

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- broccoli **or** cauliflower	- flowering brassica, head cabbages and curly kale
- Brussels sprouts	- head cabbages and curly kale
- small radish or black radish	- radishes

Extrapolation to protected breeding and seed production of brassica vegetables is not possible.

The phytotoxicity for protected plant breeding and seed production is extrapolated from the protected breeding of floriculture crops or vegetable crops.

9.18 Mould in endive and lettuce: (*Lactuca* spp.)

The extrapolations involve a crop treatment.

9.18.1 Efficacy

Test organism

- grey mould *Botryotinia fuckeliana*
- Rhizoctonia disease *Thanatephorus cucumeris*
- Sclerotinia blight (white mould) *Sclerotinia minor*

Test crop

- head lettuce

Head lettuce is most susceptible for the 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, lettuce (*Lactuca* spp.) and aromatic herbs

The number of treatments must be the same.

9.18.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- head lettuce

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs

Head lettuce has thin leaves and is therefore more susceptible for phytotoxicity compared to types such as iceberg lettuce, which has thicker and harder leaves. Other lettuce varieties have similar leaf structures to iceberg lettuce. Head lettuce can serve as a model for other lettuce varieties.

9.19 Mould in brassica vegetables

The extrapolations involve a crop treatment.

9.19.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckeliana*
- Rhizoctonia disease	*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 to the 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, radishes
- Chinese cabbage	- Rhizoctonia disease in radishes

Grey mould and Rhizoctonia disease occur in the above-mentioned crops.

9.19.2 Phytotoxicity

Phytotoxicity can be observed in the efficacy tests for Chinese cabbage. For small radish and black radish, separate phytotoxicity trials are needed.

Test crops

- Chinese cabbage
- black radish **or** small radish

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Chinese cabbage	- brassica vegetables
- black radish **or** small radish	- radishes

There is no expertise about extrapolation from Chinese cabbage to black radish and small radish.

9.20 White rot in bulb vegetables (onions, shallots and spring onions)

The extrapolations involve a crop treatment.

9.20.1 Efficacy

Test organism

- onion white rot — *Sclerotium cepivorum*

Test crop

- first-year bulb onion

This is a crop with a dense structure. The fungus can therefore easily pass from plant to plant. Moreover, high demands are placed on the control because the first-year bulb onions must be free of damage.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- first-year bulb onion	- bulb vegetables (seed onion, second-year bulb onion, silverskin onion, pickling onion, bulb shallots, seed shallots, spring onion and garlic.)

9.20.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- first-year bulb onion

Between the various onion species and shallots there are no differences in sensitivity to phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- first-year bulb onion	- bulb vegetables (seed onion, first-year bulb onion, silverskin onion, pickling onion, bulb shallots, seed shallots, spring onions and garlic.)

9.21 Rhinzoctonia disease in brassica vegetables

The extrapolations involve a crop treatment.

9.21.1 Efficacy

Test organism

- Rhizoctonia disease *Thanatephorus cucumeris*

Test crop

- cauliflower

This crop is susceptible to the above-mentioned disease.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cauliflower	- flowering brassicas, curly kale and head cabbages

9.21.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- cauliflower

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cauliflower	- flowering brassicas, curly kale and head cabbages

9.22 Cutworms

The extrapolation involves treatment of the soil before the crop is planted.

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:
- cutworm	- *Agrotis* spp.

Cutworms are larvae of certain species of night-flying moths (such as *Agrostis* spp.). There is no difference in sensitivity for plant protection products between the different cutworm species.

b) crops

from:	to:
- endive	- lettuce (*Lactuca* spp.), lamb's lettuce and fennel
- iceberg lettuce	- endive, lettuce (*Lactuca* spp.), lamb's lettuce and fennel

Cutworms mainly cause damage in transplanted vegetable crops, particularly in the above-mentioned crops. Damage in sown crops can occur, but is not a problem due to the high density 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, lettuce (*Lactuca* spp.), lamb's lettuce and fennel

9.23 Flea beetles

The extrapolations involve a crop treatment.

9.23.1 Efficacy

Test organism

- crucifer flea beetle *Phyllotreta cruciferae*

Crucifer flea beetle is the most common species.

Test crop

- small radish

Flea beetles cause a lot of damage in crucifers (with the exception of black radish, witch is less susceptible). Of the crucifers, small radish is most susceptible for infestation.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- crucifer flea beetle	- other flea beetles (*Phyllotreta* spp.)

b) crops

from:	to:
- small radish	- radishes, gherkin, flowering brassica, curly kale, red beet, head cabbages

9.23.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops
- small radish
- gherkin

Gherkins are susceptible to phytotoxicity. It concerns a crop with few roots and larges leaves, which increases the risk of phytotoxicity.
Brassica vegetables have a wax layer and are therefore less susceptible to phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- small radish	- radishes, flowering brassica, curly kale, red beet, head cabbages
- gherkin	- radishes, flowering brassica, curly kale, red beet, head cabbages

It is possible to determine phytotoxicity on small radish. Extrapolation to gherkins is in that case not possible. Gherkins are more susceptible for phytotoxicity than small radish.

9.24 Leaf aphids (with the exception of the cabbage aphid)

The extrapolations involve a crop treatment.

9.24.1 Efficacy

Test organism

- lettuce aphid	*Nasonovia ribisnigri*
- green peach aphid	*Myzus persicae*

The lettuce aphid is especially common in leafy crops like lettuce and is the most harmful leaf aphid. This aphid hides deep in the heart of the plant.
Note: Some lettuce varieties are resistant to lettuce aphids. These varieties are not suitable as test crop.

Test crop

- iceberg lettuce	- in iceberg lettuce, lettuce aphid has hidden behaviour
- Chinese cabbage	- green peach aphid: Chinese cabbage is the most susceptible of the brassica vegetables

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 due to its hidden behaviour in this crop.*** - other leaf aphids species that occur in herbs

b) crops

from:	to:
- iceberg lettuce	- endive, celery, celery leaves, celeriac, fennel, kohlrabi, red beet, pak-choi, amsoi, rhubarb, redloof chicory, lettuce (*Lactuca* spp.), slicing bean, lamb's lettuce, witloof chicory (roots), and aromatic herbs.
- Chinese cabbage	- gherkin, celery, celery leaves, zucchini, pattison, celeriac, fennel, kohlrabi, red beet, pak-choi, amsoi, leek, rhubarb, redloof chicory, lettuce (*Lactuca* spp.), endive, spinach, slicing bean, lamb's lettuce, witloof chicory (roots), French bean, scarlet runner bean, parsley, chervil and leaf celery

If trials are carried out in both iceberg lettuce and Chinese cabbage, extrapolation to all vegetable crops in which leaf aphids occur is possible, but extrapolation to carrots is not possible. The small carrot aphid occurs only 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) is rare in outdoor crops and there is no expertise in extrapolation from lettuce aphid or green peach aphid to cotton aphid.
- Cabbage aphid has hidden behaviour. Possibilities for extrapolations are listed separately.

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	- lettuce (*Lactuca* spp.), endive and aromatic herbs
- Chinese cabbage	- flowering brassicas, curly kale and head cabbages

Head lettuce has thin leaves and is therefore more susceptible for phytotoxicity compared to types such as iceberg lettuce, which has thicker and harder leaves. Other lettuce varieties have similar leaf structures to iceberg lettuce. Head lettuce can serve as a model for other lettuce varieties.

9.25 Leaf aphids, cabbage aphid

The extrapolations involve a crop treatment.

9.25.1 Efficacy

Test organism

- cabbage aphid *Brevicoryne brassicae*

Test crop

- Brussels sprouts

Cabbage aphid in Brussels Sprouts is the most difficult to control.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- cabbage aphid	cabbage aphid, green peach aphid, lettuce aphid and black bean aphid

Of the aphid species, cabbage aphid is the most difficult to control.

b) crops

from:	to:
- Brussels sprouts	- celery, flowering brassica, curly kale, celeriac, fennel, kohlrabi, red beet, pak-choi, amsoi and head cabbages

9.25.2 Phytotoxicity

Can be observed in the efficacy tests.

Test crops

- Brussels sprouts
- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Brussels sprouts	- curly kale and head cabbage
- Chinese cabbage	- brassica vegetables, celery, celeriac, fennel, red beet and kohlrabi

9.26 Swede midge

The extrapolations involve a crop treatment.

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 brassica vegetables because broccoli has multiple growing points. In addition, broccoli is an open, tall crop and Swede midge is transported by the wind.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- broccoli	- head cabbages, flowering brassicas and Chinese cabbage

Swede midge is a problem in the aforementioned brassica vegetables.

9.26.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- broccoli

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- broccoli	- head cabbages and flowering brassicas

9.27 Cabbage root fly

The extrapolation involves treatment of the tray, the 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
- small radish or black radish for treatment of the soil

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cauliflower	- flowering brassica, curly kale, Swede, kohlrabi, head cabbages (this applies to tray treatment, plant foot treatment)
- small radish	- radishes
- black radish	- radishes

Small radish and black radish are sown in place. Cabbage root fly in these crops can be controlled only by treating the entire field. Extrapolation from cauliflower is not possible for this reason. Supplementary crop treatments are necessary to ensure complete 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.

The extrapolation involves the control of cabbage root fly to prevent loss of plants, but does not include late control of cabbage root fly in Brussels sprouts.

9.27.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- cauliflower
- small radish
- black radish

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cauliflower	- flowering brassicas, curly kale, Swede, kohlrabi and head cabbages

from:	to:
- small radish	- radishes
- black radish	- radishes

9.28 Leafminers

The extrapolations involve a crop treatment.

9.28.1 Efficacy

Test organism

- pea leafminer *Liriomyza huidobrensis*

Test crop

- pak-choi
- amsoi
- small radish
- black radish

In these crops infestation occurs easily and damage in these crops is easy to evaluate.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

Phytomyza spp. and *Agromyzidae* can also occur in the field production of vegetable crops. There is no expertise about possibilities of extrapolation from *Liriomyza huidobrensis* to these other crops.

b) crops

from:	to:
- one of the test crops mentioned above	- radishes, endive, gherkin, celery, Chinese cabbage and lettuce (*Lactuca* spp.), aromatic herbs.

9.28.2 Phytotoxicity

Test crops

- head lettuce
- gherkin

Head lettuce has thin leaves and is therefore more susceptible for phytotoxicity compared to types such as iceberg lettuce, which has thicker and harder leaves. Other lettuce varieties have similar leaf structures to iceberg lettuce. Head lettuce can serve as a model for other lettuce varieties.
Gherkins are susceptible for plant protection products as well.
There is no expertise about possibilities for extrapolation from head lettuce to gherkins. For that reason trials need to be carried out in both head lettuce and gherkins.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- head lettuce	- endive, celery, Chinese cabbage and lettuce (*Lactuca* spp.), aromatic herbs
- gherkin	- radishes

9.29 Leek moth

The extrapolations involve a crop treatment.

9.29.1 Efficacy

Test organism

- leek moth *Acrolepiopsis assectella*

Test crop

- leek
- seed onions
- first-year or second-year bulb onion
- silverskin onion
- pickling onion

Leek moth can be a problem in one of the crops. There is no preference for the assessment of the effect crop selection, but for the assessment of phytotoxicity there is a preference for leek.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- one of the test crops mentioned above	- the other test crops mentioned above

9.29.2 Phytotoxicity

Can be determined 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	- bulb vegetables (seed onion, first-year bulb onion, second-year bulb onion, silverskin onion, pickling onion, spring onions and garlic.)

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 if preferred for phytotoxicity assessments.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- wireworms	- other *Agriotes* spp.

b) crops

from:	to:
- one of the test crops mentioned above	- the other test crops and lettuce (*Lactuca* spp.)

The pest-crop relationship is of secondary importance because the product is used before planting.

9.30.2 Phytotoxicity

Can be determined 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 and lettuce (*Lactuca* spp.)

9.31 Caterpillars, cabbage larvae

The extrapolations involve a crop treatment.

9.31.1 Efficacy

Test organism

- diamondback moth *Plutella xylostella*

Of cabbage larvae, the caterpillars of the diamondback moth are most difficult 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*), tortrix moth (*Clepsis spectrana*), cabbage moth (*Mamestra brassicae*) and garden pebble (*Evergestis forficalis*)

Large white and tortrix moth usually don't cause economic damage.

b) crops

from:	to:
- cauliflower	- flowering brassicas, leafy brassicas and head cabbages
- head cabbage	- flowering brassicas, leafy brassicas and head cabbages

Cabbage larvae can be a pest 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 brassica vegetables. Chinese cabbage has no wax layer.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cauliflower	- flowering brassicas, curly kale and head cabbages
- head cabbage	- head cabbages
- Chinese cabbage	- flowering brassicas, leafy brassicas and head cabbages

9.32 Caterpillars, not being cabbage larvae

Reference of the extrapolation is the treatment of a crop.

9.32.1 Efficacy

Test organism

- silvery moth *Autographa gamma*

Test crop

- endive
- swederape
- head lettuce
- iceberg lettuce

Caterpillars of silvery moth are a problem in all test crops. For efficacy assessments there is no preference for one of the mentioned test crops. Head lettuce is preferred for phytotoxicity assessments.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- one of the test crops mentioned above	- the other test crops mentioned, lettuce (*Lactuca* spp.) and aromatic herbs.

9.32.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- head lettuce

Head lettuce has thin leaves and is therefore more susceptible for phytotoxicity compared to types such as iceberg lettuce, which has thicker and harder leaves. Other lettuce varieties have similar leaf structures to iceberg lettuce. Head lettuce can serve as a model for other lettuce varieties.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- head lettuce	- endive, swede, lettuce (*Lactuca* spp.) and aromatic herbs

9.33 Thrips, bulbvegetables

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 is not possible to other organisms.

b) crops

from:	to:
- seed onion	- bulb vegetables (first-year bulb onion, second-year bulb onion, pickling onion, silverskin onion, seed shallot and bulb shallot, spring onions and garlic.) - beets (sugar and fodder beet (cabbage thrips)), peas (dry), pea without pod (cabbage thrips and pea thrips)

In beets and peas the demands for the level of control are lower in comparison with onion, which makes this extrapolation possible. Also control of thrips in beets and peas is easier.

Infestation with thrips is also a problem in leek and head cabbage. Extrapolation from onion to leek and head cabbage is not possible. In contrast to onion, thrips (young larvae) have hidden behaviour in leek and head cabbage. Extrapolation from leek to head cabbage is not possible either. Adult thrips in leek are easy to control because they live on the outside of the leaves. Young larvae in leek have hidden behaviour. In head cabbage all stages of the thrips have hidden behaviour. There is no expertise about possibilities of extrapolation from head cabbage to leek.

Note: Thrips-tolerant varieties of head cabbage are available.

9.33.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- seed onion

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- seed onion	- bulb vegetables (first-year bulb onion, second-year bulb onion, pickling onion, silverskin onion, seed shallot and bulb shallot, spring onions 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 thrips. In addition, thrips in head cabbage (including white cabbage) have hidden behaviour and are therefore difficult to control.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- white cabbage	- head cabbages and flowering brassicas

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 hidden behaviour, in contrast to thrips in onions. Extrapolation from leek to head cabbage is not possible either. Adult thrips in leek are easy to control because they live on the outside of the leaves. Young larvae in leek have hidden biology. In head cabbage all stages of the thrips have hidden biology. There is no expertise about possibilities of extrapolation from head cabbage to leek.

Note: Thrips-tolerant varieties of head cabbage are available.

9.34.2 Phytotoxicity

Test crops

- Chinese cabbage

POSSIBILITIES OF EXTRAPOLATION

from:	to:

- Chinese cabbage	- head cabbages, flowering brassicas and leafy brassica

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 is not possible to other organisms.

b) crops

from:	to:
- leek	- bulb vegetables (seed shallot and bulb shallot, spring onion, seed onion, first-year and second-year bulb onion, silverskin onion, pickling onion and garlic)

9.35.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- leek

Leek is susceptible for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- leek	- bulb vegetables (seed shallot and bulb shallot, spring onion, seed onion, first-year and second-year bulb onion, silverskin onion, pickling onion and garlic)

9.36 Carrot fly

The extrapolations involve a crop treatment.

9.36.1 Efficacy

Treatment of the soil is no longer used. The costs were too high. Soil treatments have been replaced by crop treatments.

Test organism

- carrot fly *Psila rosae*

Stages
Flies (adults of the first generation)

Test crop

- winter carrot bunching carrot or washed carrot

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- winter carrot, bunching carrot or washed carrot	- carrots, parsnip, celery, celeriac, fennel, leaf celery and parsley.

The crop treatment in winter carrot is aimed at the first generation of the carrot fly, in the other mentioned crops it is aimed at the second and third generation. Efficacy can be extrapolated from controlling the first generation in winter carrot. The mentioned crops usually escape damage from the carrot fly due to the late start of the culture.

9.36.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- winter carrot, bunching carrot or washed carrot

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- winter carrot, bunching carrot or washed carrot	carrots, parsnip, celery, celeriac and fennel

9.37 Lettuce root aphid

The extrapolations involve a crop treatment.

9.37.1 Efficacy

Test organism

- lettuce root aphid *Pemphigus bursarius*

Test crop

- endive

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- endive	- lettuce (Lactuca spp.)

Note:
A number of head lettuce varieties are resistant to 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, compared to e.g. iceberg lettuce which has firmer and hardener leaves, when the crop is treated with a chemical. Other lettuce varieties have similar leaf structures to iceberg lettuce.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- head lettuce	- endive and lettuce (*Lactuca* spp.)

9.38 Mites, two-spotted spider mite

The extrapolations involve a crop treatment.

9.38.1 Efficacy

Test organism

- two-spotted spider mite — *Tetranychus urticae*

Test crop

- bean with pod (*Phaseolus* spp.)

Two-spotted spider mite is a problem in French bean (dwarf and pole), scarlet runner bean and gherkin.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- bean with pod	- other beans with pod (*Phaseolus* spp.) and gherkin, zucchini

Extrapolation is possible from the protected cultures of vegetables to the unprotected cultures of beans, gherkin, zucchini and patisson. In protected cultures spider mites are a more frequent problem than in 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 with pod (*Phaseolus* spp.)	- other beans with pod (*Phaseolus* spp.)
- gherkin	- gherkin and zucchini

9.39 Snails, slugs

The extrapolations involve a crop treatment.

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*)

There are three species of slugs: keel slugs, earth slugs and road slugs. Keel slugs live underground and cannot be controlled with the current products (granulates). Earth slugs and road slugs live mainly above ground.

b) crops

from:	to:
- one of the test crops mentioned above	- head cabbage, flowering brassicas, endive and lettuce (*Lactuca* spp.)

The control of slugs in curly 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 curly kale the slugs stay on the leaves, which makes them unreachable for the current 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, compared to e.g. iceberg lettuce which has firmer and hardener leaves, when the crop is treated with a chemical. Other lettuce varieties have similar leaf structures to iceberg lettuce. Head lettuce can serve as a model for other lettuce varieties.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- head lettuce	- flowering brassicas, head cabbage, endive, green chicory and lettuce (*Lactuca* spp.).

9.40 Weeds

9.40.1 Efficacy

Test organism

Groups:

- annual grasses	e.g. annual meadow grass, barnyard grass
- volunteer cereals	e.g. wheat, barley
- annual dicotyledonous weeds	e.g. common chickweed, fat hen, red shank
- perennial grasses	e.g. couch grass
- perennial dicotyledonous species	e.g. creeping thistle, amphibious bistort

The weed species that are mentioned are common in the unprotected culture of vegetables. Beside the mentioned species, other weed species are also suitable as test weeds.

Test crops

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

POSSIBILITIES OF EXTRAPOLATION

Weeds

from:	to:
- specific weed species in a crop	- the same weed species in other crops
- contact herbicides against a weed species (unprotected culture)	- contact herbicide against the same weed species (protected soil-bound culture)
- if trials are carried out with at least three weed species from the group annual grasses or dicotyledonous weeds	- other weed species from the same group

Extrapolation is not possible from one weed species to another because susceptibility to herbicides of weed species can be different. If trials are carried out with at least three weed species from the group annual dicotyledonous weeds or annual grasses, extrapolation is possible to the total group. However, this does not mean that all weeds from this group are susceptible. The susceptible weeds should always be stated 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 (soil bound) 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.

Crops

from:	to:

- application of a contact herbicide in soil-bound cultivation with an open crop, e.g. onion, asparagus.	- use of the same contact herbicide in a crop that closes faster (the other way around is not possible)
- unprotected soil-bound cultivation of a crop (only for contact herbicide)	- protected soil-bound cultivation of the same crop (only for contact herbicide).

9.40.2 Phytotoxicity

Test crops

Extrapolation from one crop to another is not possible for contact herbicides and soil herbicides. Exceptions are mentioned below.

from:	to:
- application in a specific crop in protected culture (only contact herbicide)	- application in the same crop in unprotected culture (only contact herbicide)
- use before sowing, planting or emergence of a certain crop (only contact herbicides)	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
- research in bunching carrots **and** winter carrots	- carrots
- witloof chicory	- large rooted chicory
- head lettuce	- iceberg lettuce and vice versa
- first-year bulb onion **and** seed onion	- second-year bulb onion
- seed onion	- seed shallot and vice versa
- sown crop	- planted crop
- fennel	- fennel (grown as herb for the leaf or seed)
- dwarf French bean	- bean with pod (Phaeseolus)
- leaf celery	- celeriac

In general, sown crops are more susceptible to phytotoxicity than transplanted crops, therefore, in a number of cases, extrapolation is possible from sown crops to transplanted crops.
Extrapolation from uses 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. germination potential) is not known.

Extrapolation from use in unprotected culture to the protected culture of the same crop is not possible.

10 VEGETABLE AND HERB GROWING (PROTECTED CULTURE)

10.1 General

If extrapolation is carried out to:

- - *Cucubitaceae*:
  - gherkin, zucchini, cucumber, melon, watermelon and pumpkins.
- - *Solanaceae*:
  - aubergine, tomato and sweet pepper.
- Lettuce (*Latuca* spp.), then the following lettuce varieties are meant:
  - Curled leaf lettuce, baby leaf, oak leaf lettuce, Lollo rosso, head lettuce, iceberg lettuce, Roman lettuce, Lolla bionda, Batavia

This chapter only describes extrapolations in the protected culture of vegetable crops and herbs. If extrapolation to unprotected cultures is possible, this is mentioned explicitly.

10.2 Gummy stem blight, *Mycosphaerella citrullina*

The extrapolation concerns a crop treatment.

10.2.1 Efficacy

Test organism

- leaf blotch *Mycosphaerella citrullina (Didymella bryoniae)*

Test crop

- cucumber

The disease pressure in cucumber is high and the crop is susceptible for infection.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cucumber	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected)

10.2.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

Of the *Cucurbitaceae,* cucumber is the most susceptible test crop for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cucumber	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops excluding lettuce (*Lactuca* spp.) and endive

10.3 Grey mould (crop treatment)

The extrapolation concerns a crop treatment.

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 is not possible to other organisms.

b) crops

from:	to:
- tomato	- fruiting vegetables and beans with pod - breeding and seed production of arable and vegetable crops (protected culture)
- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs.

Of the fruiting vegetables, tomato is most susceptible for infection by grey mould. Most important in tomato is stem infection by grey mould. Research should be done on stem infection by grey mould when tomato is the test crop. Practical experience has shown that if stem infection by grey mould is effectively controlled in tomato, then the grey mould will also be controlled in other fruiting vegetables, French bean, scarlet runner bean and slicing bean.

10.3.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. The results can be used for extrapolation to French bean, scarlet runner bean, slicing bean and other vegetables not belonging to the group of fruiting vegetables with exception of *Lactuca* spp. and endive.

- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity.
Due to the smaller production area of aubergine, some of the phytotoxicity 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive - breeding and seed production of arable and vegetable crops (protected culture)
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

- head lettuce	- endive and lettuce (*Lactuca* spp.)

With seeding and breeding cultivation, it is of great importance that the use of a product does not influence the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. Therefore it is necessary to study the influence of the product on the germination potential of the seed.
If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.

10.4 Diseases of germinating plants (crop treatment)

The extrapolation concerns a crop treatment.

10.4.1 Efficacy

Test organism

- *Pythium* spp.
Various fungus species can cause diseases of germinating plants. *Pythium* is the most important fungus.

Test crop

- as desired
Pythium can be found in many crops. There is no preference for a specific test crop.

POSSIBILITIES OF EXTRAPOLATION

a) test organism
Extrapolation is not possible to other organisms.

b) crops

from:	to:
- the chosen test crop	- other crops 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
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. Besides that, it is a good test crop for other vegetables not belonging to the group of fruiting vegetables with exception of *Lactuca* spp. and endive.

- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity. Due to the smaller production area of aubergine, some of the phytotoxicity 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive - breeding and seed production of arable and vegetable crops (protected culture)
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*
- head lettuce	- endive, lettuce (*Lactuca* spp.) and protected and unprotected cultivation of aromatic herbs

During cultivation for plant breeding or seed production, it is of great importance that the use of a product does not affect the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. Therefore it is necessary to study the influence of the product on the germination potential of the seed.
If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.

10.5 Mildew, powdery mildew in *Cucurbitaceae*

The extrapolation concerns a crop treatment.

10.5.1 Efficacy

Test organism

- powdery mildew *Sphaerotheca fusca*

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) a) test organism
Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cucumber	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected)

Extrapolation from protected culture to unprotected culture is possible. In protected culture infections are more severe and more treatments have to be carried out than in unprotected culture.

10.5.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

Of the *Cucurbitaceae,* cucumber is the most susceptible test crop for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cucumber	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops with the exception of lettuce (*Lactuca* spp.) and endive

10.6 Mildew, powdery mildew in Solanaceae

The extrapolation concerns a crop treatment.

10.6.1 Efficacy

Test organism

- powdery mildew *Leveillula taurica*

This powdery mildew species has different biology than 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 contrast to other powdery mildew species in which the mycelium is found on the outside of the leaf.

Test crop

- sweet pepper

POSSIBILITIES OF EXTRAPOLATION

a) Test organism
Extrapolation is not possible to other organisms.
Extrapolation to other powdery mildew species is not possible because of the specific biology.

b) crops

from:	to:
- sweet pepper	- fruiting vegetables of *Solanaceae* in which *Leveillula taurica* can occur

Sweet pepper is the only crop in the Netherlands in which *Leveillula taurica* occurs. Other possible host plants are aubergine, red 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

- aubergine, sweet pepper and tomato
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity .
In view of the small production area of aubergine, part of the research can be conducted in tomato. However, this disease is not found in tomato, so in this situation only some of the trials can be conducted in sweet pepper. This disease does occur in sweet pepper.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and sweet pepper)	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*

10.7 Mildew, downy mildew in gherkin and cucumber

The extrapolation concerns a crop treatment.

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 is not possible to other organisms.

b) crops

from:	to:
- cucumber	- fruiting vegetables of Cucurbitaceae (non-)edible skin (protected and unprotected)

10.7.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Of the Cucurbitaceae, cucumber is most susceptible for phytotoxicity.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cucumber	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops with the exception of *Lactuca* spp. and endive

10.8 Mildew, downy mildew in flowering brassica

The extrapolation concerns a crop treatment.

10.8.1 Efficacy

Test organism

- downy mildew *Peronospora parasitica*

Test crop

- cauliflower
- broccoli

POSSIBILITIES OF EXTRAPOLATION

a) test organism
Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cauliflower **or** broccoli	- flowering brassicas and protected breeding and seed production of brassica vegetables

10.8.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- broccoli
The main shoot is harvested first. When the tested product comes in contact with the incised wound where the main shoot was cut off, phytotoxicity may occur. For that reason broccoli is the most suitable test crop in phytotoxicity trials.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- broccoli	- cauliflower - - protected culture for plant breeding and seed production of brassica vegetables

During cultivation for plant breeding or seed production, it is of great importance that the use of a product does not affect the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. Therefore it is necessary to study the influence of the product on the germination potential of the seed. If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.

10.9 Mildew, downy mildew in herb cultivation

The extrapolation concerns a crop treatment.

10.9.1 Efficacy

Test organism

- downy mildew *Plasmopara petroselini*

Test crop

- parsley (protected culture)

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- parsley	- parsley, chervil, leaf celery (protected and unprotected culture)

10.9.2 Phytotoxicity

Can be determined in the efficacy tests.

Test crops

- parsley (protected culture)

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- parsley	- parsley, chervil, leaf celery (protected and unprotected culture)

10.10 Mould in endive, head lettuce and iceberg lettuce

The extrapolation concerns a crop treatment.

10.10.1 Efficacy

Test organism

- grey mould	*Botryotinia fuckleniana (*former name *Botrytis cinerea)*
- Rhizoctonia disease	*Thanatephorus cucumeris*
- sclerotinia blight	*Sclerotinia minor*

Test crop

- head lettuce
Head lettuce is most susceptible for mould.

POSSIBILITIES OF EXTRAPOLATION

a) test organism
Extrapolation is not possible between test organisms and to other organisms.

b) crops

from:	to:
- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic 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, lettuce (*Lactuca* spp.) and aromatic herbs.

10.11 Mould in brassica vegetables

The extrapolation concerns a crop treatment.

10.11.1 Efficacy

Test organism

- grey mould *Botryotinia fuckeliana* (former *Botrytis cinerea*)
- Rhizoctonia disease *Thanatephorus cucumeris*

Test crop

- Chinese cabbage

Chinese cabbage is susceptible for the above-mentioned diseases.

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)	- kohlrabi, radishes
- Chinese cabbage (Rhinzoctonia disease)	- radishes

10.11.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- Chinese cabbage
- black radish

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- Chinese cabbage	- kohlrabi There is no expertise about extrapolation from Chinese cabbage to black radish and small radish.
- black radish	- radishes

10.12 Foot diseases in fruiting vegetables

The extrapolation concerns a crop treatment.

10.12.1 Efficacy

Test organism

- root rot *Pythium* spp. *of Pythium aphanidermatum*
- damping-off disease *Thanatephorus* spp. or *Thanatephorus cucumeris*
- foot and root rot *Phytophthora* spp. or *Phytophthora capsici*

Test crop

- cucumber (*Pythium* spp.)
- tomato (*Thanatephorus cucumeris, Phytophthora nicotianae*)

These crops are susceptible for the above-mentioned diseases.

POSSIBILITIES OF EXTRAPOLATION

a) test organism
Extrapolation is not possible between test organisms and to other organisms.

b) crops

from:	to:
- cucumber	- fruiting vegetables in which *Pythium* spp. occur
- tomato	- fruiting vegetables in which *Phytophthora* spp. resp. *Thanatephorus* spp. occur

10.12.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. Besides that, it is a good test crop for other vegetables not belonging to the group of fruiting vegetables with exception of Lactuca spp. and endive.

- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity. Due to the smaller production area of aubergine, some of the phytotoxicity 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*
- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs.

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible.

10.13 Grey mould in flowering brassica

The extrapolation concerns a crop treatment.

10.13.1 Efficacy

Test organism

- Rhizoctonia disease *Thanatephorus cucumeris*

Test crop

- cauliflower
This crop is susceptible to the above-mentioned disease.

POSSIBILITIES OF EXTRAPOLATION

a) test organism
Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cauliflower	- flowering brassica

In other protected cultures of crucifers, grey mould is not a problem.

10.13.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- broccoli
The main shoot is harvested first. When the tested product comes in contact with the incised wound where the main shoot was cut off, phytotoxicity may occur. For that reason broccoli is the most suitable test crop in phytotoxicity trials.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- broccoli	- flowering brassica

10.14 Aphids (crop treatment)

The extrapolation concerns a crop treatment.

10.14.1 Efficacy

Test organism

- potato aphid	*Macrosiphum euphorbiae*
- glasshouse potato 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 aphid species in the protected culture of vegetable crops. Black bean aphid mainly occurs in beans.

Stages
Larvae and adults

Test crop

- cucumber
The control of aphids in this crop is difficult because of the large leaves.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- a single aphid species	- the same aphid species in other crops
- cotton aphid and two other aphid species	- all aphid species mentioned with test organisms.

The underlying idea is that of the common aphid species, cotton aphid is the most difficult to control. If the product controls cotton aphid and two other aphids, extrapolation is possible to all other aphids that can be found in these crops.

Extrapolation is not possible to unprotected culture because the climate conditions are totally different, the cultures are not always comparable and much more severe infections can occur outdoors. Extrapolation of efficacy against cotton aphid to the unprotected culture of crops is possible. Cotton aphids occur in the unprotected culture of crops only under unusual circumstances. Therefore, the cotton aphid will not have optimal conditions in the outdoor environment and it will be easier to control than in protected cultures.

b) crops

from:	to:
- cucumber	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected), fruiting vegetables of *Solanaceae*, flowering brassicas (no cabbage aphid), Chinese cabbage (no cabbage aphid), bean with pod, fennel, kohlrabi, red beet, carrots, turnip tops, radishes, aromatic herbs, lettuce (*Lactuca* spp.), endive, spinach family, lamb's lettuce. - breeding and seed production of arable and vegetable crops (protected culture)

10.14.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. 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.
- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity.
In view of the small production area of aubergine, part of the phytotoxicity 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops with the exception of *Lactuca* spp. and endive - breeding and seed production of arable and vegetable crops (protected culture)
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible for phytotoxicity.

- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs.

During cultivation for plant breeding or seed production, it is of great importance that the use of a product does not affect the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germination potential of the seed. If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.

10.15 Leafminers

The extrapolation concerns a crop treatment.

10.15.1 Efficacy

Test organism

- tomato leafminer *Liriomyza bryoniae*
- American serpentine leafminer *Liriomyza trifolii*
- pea leafminer *Liriomyza huidobrensis*

Stages

Larvae

Test crop

- tomato

This crop is susceptible to the above-mentioned pests. Infestation 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
- American serpentine leafminer	- American 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) occur. *L. bryoniae* and *Chromatomyia syngenesiae* occur less frequently 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* occurs frequently and is the most difficult to control of the four species.

b) crops

from:	to:
- tomato	- fruiting vegetables from *Solanaceae*, fruiting vegetables from *Cucurbitaceae* (non-)edible skin (protected and unprotected), bean with pod, kohlrabi, radishes, celery leafs, spinach family, endive, lettuce (*Lactuca* spp.), Chinese cabbage, celery and aromatic herbs.

10.15.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. 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.

- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity.
In view of the small production area of aubergine, 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*
- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs.

10.16 Caterpillars

The extrapolation concerns a crop treatment.

10.16.1 Efficacy

Test organism

- tomato looper *Chrysodeixis chalcites*
- beet armyworm *Spodoptera exigua*

Test crop

- as desired
Tomato looper can be found in several crops. There is no preference for a specific test crop.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

- tomato looper	Extrapolation is not possible to other organisms.
- beet armyworm	Extrapolation is not possible to other organisms.

b) crops

from:	to:
- the chosen test crop	- other crops where tomato looper and/or beet armyworm occur: Protected culture of fruiting vegetables of *Cucurbitacaea* (non-)edible skin, fruiting vegetables of *Solanacaea*, ornamental crops, tree nursery crops and all other vegetable crops.

10.16.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. 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.

- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity.
In view of the small production area of aubergine, 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible for phytotoxicity.

- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs.

10.17 Thrips

The extrapolation concerns a crop treatment.

10.17.1 Efficacy

Test organism

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

Stages
Larvae and adults

Test crop

- sweet pepper
- aubergine

Western flower thrips has hidden behaviour 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 thrips (*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 hidden behaviour and therefore the most difficult 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 behaviour. Sweet pepper and aubergine 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. Therefore separate data for this thrips are needed.

b) crops

from:	to:
- aubergine	- fruiting vegetables from *Solanaceae*, fruiting vegetables from *Cucurbitaceae* (non-)edible skin, bean with pod, radishes, parsley, celery leafs, lettuce (*Lactuca* spp.) and endive. - breeding and seed production of arable and vegetable crops (protected culture)
- sweet pepper	- fruiting vegetables from *Solanaceae*, fruiting vegetables from *Cucurbitaceae* (non-)edible skin, bean with pod, radishes, parsley, celery leafs, lettuce (*Lactuca* 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
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. 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.
- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity.
In view of the small production area of aubergine, 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected), parsley, celery leafs and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive - the protected breeding and seed production of arable and vegetable crops
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible for phytotoxicity.

- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs.

During cultivation for plant breeding or seed production, it is of great importance that the use of a product does not affect the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germination potential of the seed. If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.

10.18 Whitefly

The extrapolation concerns a crop treatment.

10.18.1 Efficacy

Test organism

- silverleaf whitefly *Bemisia argentifolii (B. tabaci)*

The glasshouse whitefly can also occur in vegetable crops.

Stages
Larvae and adults

Test crop

- aubergine
- cucumber

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- silverleaf whitefly	- silverleaf whitefly and glasshouse whitefly

Because silverleaf whitefly is more difficult to control than greenhouse whitefly, it is possible to extrapolate from silverleaf whitefly to glasshouse whitefly, provided that small-scale research shows that the product controls glasshouse whitefly and the results are consistent for both organisms.

b) crops

from:	to:
- aubergine	- protected culture of all other vegetable and herb crops - breeding and seed production of arable and vegetable crops (protected culture)
- cucumber	- protected culture of all other vegetable and herb crops - breeding and seed production of arable and vegetable crops (protected culture)

Silverleaf whitefly and glasshouse whitefly are both uncommon 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 outdoors and are easier to control than in the glasshouses. Extrapolation to unprotected culture is possible if it is shown that glasshouse whitefly can be well controlled in protected culture.

10.18.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber

Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. 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.

- aubergine

Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity.
In view of the small production area of aubergine, 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	- fruiting vegetables of *Cucurbitaceae* (non-)edible skin (protected and unprotected) and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive - breeding and seed production of arable and vegetable crops (protected culture)
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible for phytotoxicity.

- head lettuce	- endive, lettuce (*Lactuca* spp.) and aromatic herbs.

During cultivation for plant breeding or seed production, it is of great importance that the use of a product does not affect the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germination potential of the seed. If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.

10.19 Spider mites

The extrapolation involves a crop treatment. Extrapolation is only possible to the same stage of the insect that had been assessed.

10.19.1 Efficacy

Test organism

- two spotted spider mite or red spider mite *Tetranychus urticae*

Besides two spotted spider mite, tomato russet mite (*Aculopsi lycopersici*) also occurs in tomato. In aubergine and sweet pepper, broad mite (*Polyphagotarsonemus latus)* is a problem. However, these are not spider mites. This extrapolation relates only to spider mites

Test crop

- aubergine

This crop has large, hairy leaves, which 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:
- aubergine	- fruiting vegetables from *Solanaceae*, fruiting vegetables from *Cucurbitaceae* (non-)edible skin, bean with pod. - 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 also possible. In protected cultures, spider mites are a more frequent problem than in unprotected cultures.

10.19.2 Phytotoxicity

Separate phytotoxicity research should be conducted.

Test crops

- cucumber
Of the *Cucurbitaceae*, cucumber is the most susceptible test crop for phytotoxicity. 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.

- aubergine
Of the *Solanaceae,* aubergine is most susceptible for phytotoxicity.
In view of the small production area of aubergine, part of the research can be conducted in tomato.

POSSIBILITIES OF EXTRAPOLATION

from:	to:
- cucumber	- fruiting vegetables of *Cucurbitaceae* (protected and unprotected) and other vegetable crops, excluding lettuce (*Lactuca* spp.) and endive - breeding and seed production of arable and vegetable crops (protected culture)
- aubergine	- fruiting vegetables of *Solanaceae*
- aubergine (and tomato)	- fruiting vegetables of *Solanaceae*

Extrapolation between *Cucurbitaceae* and *Solanaceae* is not possible for phytotoxicity.

During cultivation for plant breeding or seed production, it is of great importance that the use of a product does not affect the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. It is necessary to research the influence of the product on the germination potential of the seed. If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.

10.20 Weeds

In the protected culture of vegetable,s weeds are not a problem. When weeds do cause a problem the extrapolation possibilities are mentioned below.
There is no experience with the use of herbicides on artificial substrate.

10.20.1 Efficacy

Test organism
Groups:

- annual grasses	e.g. annual meadow grass, barnyard grass
- annual dicotyledonous weeds	e.g. common chickweed, fat hen, red shank
- perennial grasses	e.g. couch grass
- perennial dicotyledonous species	e.g. creeping thistle, amphibious bistort

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

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

POSSIBILITIES OF EXTRAPOLATION

Weeds

from:	to:
- specific weed species in a crop	- the same weed species in other crops
- contact herbicides against a weed species (unprotected culture)	- contact herbicide against the same weed species (protected soil-bound culture)
- if trials are carried out with at least three weed species from the group annual grasses or annual dicotyledonous weeds	- other weed species from the same group

Extrapolation from one weed species to other weed species is not possible due to the difference between the sensitivity of the weed species for a herbicide. However, if trials are carried out with at least three weed species from the group annual dicotyledonous weeds or annual grasses, then the total group can be included on the label. This does not mean that all weeds of this group are susceptible. The susceptible weeds should always be stated 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 herbicides and soil herbicides is not possible from soil-bound crops or
trays to artificial substrate.
There is no experience with herbicides on artificial substrates concerning efficacy.

Extrapolation of 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.

Crops from:	to:
- use of a contact herbicide in an open field crop (e.g. onion or asparagus)	- use of the same contact herbicide in a crop that closes faster (the other way around is not possible)
- unprotected soil-bound cultivation of a crop (only for contact herbicide)	- protected soil-bound cultivation of the same crop (only for contact herbicide).

10.20.2 Phytotoxicity

Test crops

Extrapolation from one crop to another is not possible for contact herbicides and soil herbicides. Exceptions are mentioned below.

from:	to:
- application in a specific crop in protected culture (only for contact herbicide)	- application in the same crop in unprotected culture (only for contact herbicide)
- use before sowing, transplanting or emergence of a certain crop (only for contact herbicides)	pre-emergence, pre-sowing or pre-planting application in another crop (only for 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 is no experience with herbicides on artificial substrates concerning harmful effects.

Extrapolation from uses 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. germination potential) is not known.

Extrapolation from applications in the unprotected soil-bound cultivation to the soil-bound protected cultivation of the same crop is not possible.

11 Seed production

11.1 Efficacy

Test crop

- Growth of crop production

POSSIBILITIES OF EXTRAPOLATION

a) Crops

from:	to:
- regular crop production	- seed production for the same crop

This is the case for fungicides, herbicides and insecticides.

Conditions:
- The control in seed production is the same as in regular crop production.
- No other requirements are placed on the efficacy of the products used in seed production.
- The methods of treatment do not differ materially from seed production and regular crop production.
- The level of infestation does not differ materially between seed production and regular crop production, so 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 prevent the used of a product in seed production. An example is toxicity for bees. If a product is toxic for bees, and for good efficacy a product must be used during flowering, then extrapolation from crop production to seed production is not possible.

11.2 Phytotoxicity

Test crop

- regular crop production

POSSIBILITIES OF EXTRAPOLATION

a) Crops

from:	to:
- regular crop production	- seed production for the same crop

This is the case for fungicides, herbicides and insecticides.

Extrapolation is only possible for crop damage like stunting or necrosis.
Conditions mentioned under **Efficacy** should be taken into account.
Moreover, a crop that is grown for seed production should not be more sensitive for phytotoxicity than the crop grown for regular production.

It is of great importance that the use of a product does not influence the germination potential of the seed. Extrapolation is not possible from a corresponding production culture. Therefore it is necessary to study the influence of the product on the germination potential of the seed.
If practical experience shows that the product has no influence on the germination potential of the seed, additional research is not necessary.
For example, separate germination research is not required for products used in cereals. This is because years of practical experience have shown that that these products do not influence the germination potential.

12 DISINFECTION OF SEED

12.1 General

12.1.1 Efficacy

In the case of disinfection or treatment of sowing seed, the aim is to control:
a) seed-borne fungi that can infect the germinating plants or mature plants, such as bunt in wheat. These are defined as seed-borne diseases.
b) soil fungi that can infect the germinating plants. These are defined as soil-borne diseases.

A very common soil-borne fungus is *Pythium*, which can infect many crops. An important species is *P. ultimum,* but other *Pythium* species can also occur.
Fusarium spp. and *Botryotinia fuckeliana (Botrytis cinerea)* can also 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

Phytotoxicity research with products used for seed disinfection and treatment should be conducted in separate trials and under protected or semiprotected conditions.
The test crops and possibilities for extrapolation are described in a separate **Phytotoxicity** chapter**.**
The **Phytotoxicity** chapter is based on the protocol for research on phytotoxicity for products used for disinfection of seeds in agriculture and horticulture. The Dutch Association for Sowing seeds and Plant material (NVZP) prepared this protocol.
The test crops are listed in the left column, the extrapolation possibilities are listed in the right column. Little or no experience has been acquired with extrapolations from the right column to the left column. If extrapolation is possible, this is stated.

Separate phytotoxicity research is needed for crops that are listed in the **Efficacy** chapter but not in the **Phytotoxicity** chapter.
In the **Phytotoxicity** chapter, more crops are listed than in the **Efficacy** chapter**.** For these crops it is possible to extrapolate phytotoxicity, but extrapolation is not possible for efficacy. Separate efficacy research is needed for these crops.
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SEED-BORNE DISEASES

12.2 Onion leaf blight

12.2.1 Efficacy

Test organism

- leaf blotch — *Botryotinia squamosa*

Test crop

- Onion

It is possible to chose any onion species in which the fungus can occur as a seed-borne disease as a test crop because there are no differences in susceptibility between the onion species. Due to the large production area, seed onion will often be chosen as a test crop. The relevant onion types are: seed onion, first-year bulb onion, pickling onion, silverskin onions and spring onion. *Botryotinia squamosa* can infect the onions during the 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	- bulb vegetables in which the fungus occurs as a seed-borne disease

12.2.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.3 *Fusarium culmorum* in cereals

12.3.1 Efficacy

Test organism

- *Fusarium culmorum*

Test crop

- winter wheat
- winter barley

The disease can be found in both winter wheat and winter barley but winter wheat will more often be infected. Infection is also possible in both spring wheat and spring barley, but the level of infection is much lower.

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- winter wheat or winter barley barley,	- winter wheat, winter barley, spring wheat, spring spelt and teff

12.3.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.4 *Fusarium* spp. in non-cereal crops

12.4.1 Efficacy

Test organism

- *Fusarium* spp.

Test crop

- as desired

Fusarium as a seed-borne 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-borne fungus can be controlled by seed treatment; see **Soil-borne diseases** chapter**.**
Fusarium can also infect crops during growing season. This infection cannot be controlled by a seed treatment.

POSSIBILITIES OF EXTRAPOLATION

a) 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 a different *Fusarium* spp. can be found. Extrapolation is not possible from *Fusarium* spp. to the species in cereals. The extrapolation in cereals is included in separate extrapolation list.
Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on the test crop is the same as on other crops.

12.4.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

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 a 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 the crops.
Botryotinia fuckeliana as a soil fungus can be controlled by seed treatment; see **Soil-borne diseases** chapter**.** *Botryotinia fuckeliana* can also infect crops during the growing season. This infection cannot be controlled by seed treatment.

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism
Extrapolation is not possible to other organisms.

b) Crops

from:	to:
- chosen test crop	- other crops in which *Botryotinia fuckeliana* can be found as a seed-borne disease

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on the test crop is the same as 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) a) test organism

Extrapolation is not possible to other organisms.

b) Crops

from:	to:
- sugar beet	- beets (sugar beet and fodder beet) and red beet

12.6.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.7 Glume blotch

12.7.1 Efficacy

Test organism

- glume blotch *Phaeosphaeria nodorum (Stagonospora nodorum, Septoria nodorum)*

Phaeosphaeria nodorum can occur as a seed-borne disease and can infect crops during the growing season. The infection during the growing season cannot be controlled by 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 production area, winter wheat will be often chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism
Extrapolation is not possible to other organisms.

b) Crops

from:	to:
- winter wheat	- spring wheat, winter rye, spring rye, spelt and triticale.

Extrapolation can also take place from the other cereals listed under test crop to the cereals that can be affected by glume blotch; see Test crop

12.7.2 Phytotoxicity
See **Phytotoxicity** chapter**.**

12.8 Blackleg

12.8.1 Efficacy

Test organism

- black leg *Leptosphaeria maculans (Phoma lingam)*

Test crop

- as desired with the exception of oilseed rape

Phoma lingam as a seed-borne disease can occur with the following crops:
Flowering brassicas, kohlrabi, black radish, head cabbages and oilseed rape. Infection in oilseed rape is less important than infection of the other crops. Therefore oilseed rape is not a suitable test crop. One of the other crops should be chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism
Extrapolation is not possible to other organisms.

b) Crops

from:	to:
- selected test crop with the exception of oilseed rape	- other crops listed under **Efficacy**

12.8.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.9 Neck rot in bulb vegetables

12.9.1 Efficacy

Test organism

- onion neck rot — *Botrytis aclada*

Test crop

- Onion

It is possible to chose any onion species in which the fungus can occur as a seed-borne disease as a test crop because there are no differences in susceptibility between the onion species. Due to the large production area, seed onion will often be chosen as a test crop.
N.B. The onion species are seed onions, first-year bulb onions, pickling onion, silverskin onion and spring onion.
Botrytis aclada can infect crops during the growing season; 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	- bulb vegetables in which the fungus occurs as a seed-borne disease

12.9.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.10 Leaf blight in beet, *Pleospora betae*

12.10.1 Efficacy

Test organism

- leaf blotch — *Pleospora betae (*old name: *Phoma betea)*

Test crop

- sugar beet

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

c) Crops

from:	to:
- sugar beet	- beet (sugar beet, fodder beet), red beet and spinach family

12.10.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.11 [Grey leaf spot/Purple spot]

12.11.1 Efficacy

Test organism

- grey leaf spot/purple spot — *Pleospora herbarum*

Test crop

- beans (*Phaseolus* spp.)
or
- peas
or
- mangetout
or
- broad beans
or
- faba bean

Pleospora herbarum can occur in legume vegetables 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) a) test organism

Extrapolation is not possible to other organisms.

b) Crops

from:	to:
– Beans with pod **or** peas **or** mangetout **or** broad beans **or** - faba bean	– legume vegetables and faba bean (*Vicia* spp.)

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if the relative dose on the test crop is the same as on the other crop.

12.11.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

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 generally less important.

POSSIBILITIES OF EXTRAPOLATION

a) 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 diseases can be found in following crops: Flowering brassicas, leafy brassicas, radishes and head cabbages. Because not one of these crops is affected specifically, any of these crops can 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	– Flowering brassicas, leafy brassicas, radishes and head cabbages.

12.13.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

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) a) test organism

from:	to:
- *Tilletia tritici*	- *Ustilago hordei* f.sp. *hordei*

From many years of experiences it is known that if a product controls common bunt in wheat effectively, the control of common bunt (*Ustilago hordei* f.sp. *hordei*) in barley is also good.

b) Crops

from:	to:
- winter wheat	- spring wheat, winter barley and spring barley

12.14.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

SOIL-BORNE DISEASES

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 **Seed-borne diseases** chapter**.**

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism

from:	to:
- *Fusarium* spp.	- *Fusarium* spp.

From many years of experience it is known that if a product controls certain *Fusarium* species it also controls other *Fusarium* spp. manifesting as soil fungi that can infect germinating seeds and plants.

a) Crops

from:	to:
- chosen test crop	- other crops in which *Fusarium* spp. as a soil-borne disease can be found

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if dose rate on the test crop is the same as on other crops.

12.15.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

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-borne fungus can infect germinating seeds and germinating plants of many crops. No differences in susceptibility between crops are known. Therefore any crop can be chosen as a test crop.
Botryotinia fuckeliana can also occur as a seed-borne disease. see **Seed-borne diseases** chapter**.**

POSSIBILITIES OF EXTRAPOLATION

b) a) test organism
Extrapolation is not possible to other organisms.

c) Crops

from:	to:
- chosen test crop	- other crops in which *Botryotinia fuckeliana* as a soil-borne disease can be found

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if the dose rate on the test crop is the same as on other crops.

12.16.2 Phytotoxicity
See **Phytotoxicity** chapter**.**

12.17 *Pythium* spp.

12.17.1 Efficacy

Test organism

- P*ythium* spp.
A very common species is *P. ultimum*

Test crop

- beet **or**
- spinach

With exception of cereals, *Pythium* can infect germinating seeds and plants of many crops. From research it is known that beet and spinach are suitable test crops.

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism

from:	to:
- *Pythium* 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. effectively, it also controls *Pythium ultimum*.

b) Crops

from:	to:
- beet **or** spinach	- other crops in which *Pythium* spp. as soil-borne disease can be found

Seeds differ in shape, size and proportions. Therefore extrapolation is only possible if the dose rate on the test crop is the same as 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 the large production area and the level of sensitivity for damage, which depends on sowing density.

POSSIBILITIES OF EXTRAPOLATION

a) a) test organism

Extrapolation is not possible to other organisms.

b) Crops

from:	to:
- sugar beet and red beet	- beets (sugar beet and fodder beet)

12.18.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.19 Bean seed fly

12.19.1 Efficacy

Test organism

- bean seed fly *Delia platura*

Test crop

- dwarf French bean

Infection can occur in all *Phaseolus* spp. Dwarf French bean is most sensitive for infection.

POSSIBILITIES OF EXTRAPOLATION

a) test organism
Extrapolation is not possible to other organisms.

c) Crops

from:	to:
- dwarf French bean	- bean with pod and bean without pod (*Phaseaolus* spp.)

Extrapolation is not possible from other bean species to dwarf French bean. The chance of infestation is less in other beans because other beans grow quicker.

12.19.2 Phytotoxicity

See **Phytotoxicity** chapter.

12.20 Leather jacket in cereals and maize

12.20.1 Efficacy

Test organism

- leather jacket - *Tipula* spp.

Test crop:

winter cereals

Infection can occur in all winter cereals and spring cereals and in fodder maize, grain maize and sweet corn.
Most damage is expected in winter cereals due to the biology 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.
In view of the production area, winter wheat will often be chosen as a test crop.

POSSIBILITIES OF EXTRAPOLATION

a) test organism
Extrapolation is not possible to other organisms.

c) Crops

from:	to:
- winter cereals	- cereals and maize

Seeds of maize differ from cereal seeds in shape, size and proportions. Therefore extrapolation is only possible if the relative dose rate on the test crop is the same as the dose rate on other crops.

12.20.2 Phytotoxicity
See **Phytotoxicity** chapter**.**

12.21 Frit fly in cereals

12.21.1 Efficacy

Test organism

- frit fly *Oscinella frit*

Test crop

- winter wheat

Infestation occur in winter barley, winter wheat and winter rye. In view of the production 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 cereals to maize and vice versa.

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 **Phytotoxicity** chapter**.**

12.22 Cabbage root fly

12.22.1 Efficacy

Test organism

- cabbage root fly *Delia brassicae*

Test crop

- cauliflower

Larvae of cabbage root fly cause loss of plants in flowering brassicas, curly kale and head cabbages. Cauliflower is most susceptible for infestation.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

Extrapolation is not possible to other organisms.

b) crops

from:	to:
- cauliflower	- flowering brassicas, curly kale and head cabbages

12.22.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.23 Spotted millipede in beet

12.23.1 Efficacy

Test organism

- spotted millipede *Blaniulus guttulatus*

Test crop

- sugar beet

Besides sugar beet, infestations can be found in fodder beet and red beet. Due to the production 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	- beets (sugar beet and fodder beet), red beet

12.23.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.24 Wireworms in maize and cereals

12.24.1 Efficacy

Test organism

- wireworms *Agriotes* spp.

Test crop

- forage maize

Infestation can occur in maize (forage maize, grain maize and sweet corn) and all cereals (winter cereals and spring cereals). Maize is most susceptible for damage due to the biology of the insect (wireworms are most active in spring) and the sowing density (lower in maize that in cereals).
In view of the production area, forage 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:
- forage maize	- maize and cereals

Seeds of cereals differ from maize seeds in shape, size and proportions. Therefore extrapolation is only possible if the relative dose rate on the test crop is the same as dose rate on the other crops.

12.24.2 Phytotoxicity
See **Phytotoxicity** chapter.

12.25 Wheat bulb fly

12.25.1 Efficacy

Test organism

- wheat bulb fly *Delia coarctata*

Test crop

- winter wheat

Damage can occur in winter barley, winter wheat and winter rye. In view of the production 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	- winter barley and winter rye

12.25.2 Phytotoxicity

See **Phytotoxicity** chapter**.**

12.26 Springtail

12.26.1 Efficacy

Test organism

- springtail *Onychiurus armatus*

Test crop

- sugar beet

Besides sugar beet, infestations can be found in fodder beet and red beet. Sugar beet is most suitable as a test crop regarding production area and susceptibility for damage, which depends on sowing density.
In addition to *Onychiurius armatus*, other springtails of the genus *Collembola* can also occur. However, *Onychiurus armatus* is the most important species and occurs most frequently.

POSSIBILITIES OF EXTRAPOLATION

a) test organism

from:	to:
- *Onychiurus armatus*	- *Collembola* spp.

b) crops

from:	to:
- sugar beet and red beet	- beets (sugar beet and fodder beet)

12.26.2 Phytotoxicity

See **Phytotoxicity** chapter.

12.27 Onion fly in bulb vegetables and leek

12.27.1 Efficacy

Test organism

- onion fly *Delia antiqua*

Test crop:

- seed onion
or
- first-year bulb onion
or
- silverskin onion
or
- pickling onion
or
- leek (plant beds)

With seed onions, first-year bulb onion, silverskin onion, pickling onion, seed shallots and leek on plant beds, damage by the larvae of the onion fly can be controlled by a seed treatment.
In view of the production 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:
- one of the listed test crops	- the other test crops listed above

12.27.2 Phytotoxicity
See **Phytotoxicity** chapter**.**

12.28 Phytotoxicity

Test crop	Extrapolation to
sugar beet	beet (sugar beet and fodder beet), red beet, chard
forage maize	maize (sweet corn, grain maize, corncob mix and corncob silage)
sweet corn	maize (sweet corn, grain maize, corncob mix and corncob silage)
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)	pea with pod, pea without pod
seed onion	first-year bulb onion, silverskin onion, pickling onion, seed shallot, leek, spring onion, chives, Chinese chives
first-year bulb onion	seed onion, silverskin onion, pickling onion, seed shallot, leek, spring onion, chives, Chinese chives
silverskin onion	seed onion, first-year bulb onion, pickling onion, seed shallot, leek, spring onion, chives, Chinese chives
pickling onion	seed onion, first-year bulb onion, silverskin onion, seed shallot, leek, spring onion, chives, Chinese chives
seed shallot	seed onion, first-year bulb onion, silverskin onion, pickling onion leek, spring onion, chives, Chinese chives
leek	seed onion, first-year bulb onion, silverskin onion, pickling onion, seed shallot, spring onion, chives, Chinese chives

Test crop	Extrapolation to
English ryegrass	ryegrass, fescue, bluegrass, canary grass, other grasses
white clover	other *Trifolium* clover species, honey clover, hop clover, birds-foot trefoil, alfalfa
poppy seed	no possibilities for extrapolation
flax	no possibilities for extrapolation
buckwheat	no possibilities for extrapolation
tomato	fruiting vegetables of *Solanaceae*
gherkin	fruiting vegetables of Cucurbitaceae (non-)edible skin
Spinach	lamb's lettuce
Head lettuce	all lettuce (Lactuca spp.), dandelion greens
Witloof chicory	endive, redloof chicory, large rooted chicory, cardoon
winter carrot	celery, celeriac, celery, fennel, parsley, dill, fodder carrot, caraway
small radish	radishes and oil radish
cauliflower	brassica vegetables, turnips, rapeseed, summer rapeseed, leafy brassica, Swede, oilseed rape, brown mustard, yellow mustard, crambe, forage turnip
dwarf French bean (French bean)	bean with pod and bean without pod, common vetch, sand vetch