

The Minister of
Infrastructure and the Environment
Ms. S.A.M. Dijkma
P.O. Box 20901
2500 EX The Hague

DATE 21 April 2016
REF: CGM/160421-03
SUBJECT Report 'Amendment of list with containment measures for activities involving
the contained use of GM plants'

Dear Ms. Dijkma,

Further to the results of the research project 'Review of plant characteristics for the purpose of the list of containment measures' COGEM's advice is that Annex 7 to the Genetically Modified Organisms (Environmental Management) Regulation 2013 should be amended in certain areas. These amendments are set out and explained in this report.

Summary:

For activities with genetically modified (GM) plants under contained use measures have to be taken to prevent the dispersal of the sequences introduced. Annex 7 of the Netherlands' Genetically Modified Organisms Regulation includes a list of a large number of plant species stating whether specific containment measures are necessary in addition to the general containment measures laid down in the Genetically Modified Organisms Regulation to prevent the dispersal of introduced sequences through pollen, seed or reproductive plant parts.

From the results of the research project 'Review of plant characteristics for the purpose of the list with containment measures', it appears that some of the information in Annex 7 is obsolete. For some plant species changes are necessary in the naming, the stated pollination methods and/or the prescribed containment measures.

Along with this report COGEM has drawn up a revised list with containment measures that includes these changes. These changes will ensure that when working with GM plants under containment the dispersal of introduced sequences and any environmental risks arising from such will be adequately prevented. Where GM plants have been modified with sequences which code for a hazardous gene product, additional containment measures may be necessary.

The considerations applied by COGEM and the advice arrived at on basis of these considerations is provided in the enclosures with this document.

Yours sincerely,

A handwritten signature in black ink, consisting of a large, stylized 'S' followed by a horizontal line and a small loop.

Professor Sybe Schaap
Chair of COGEM

c.c. H.P. de Wijs, Head GMO Department
 J.K.B.H. Kwisthout, Ministry of Infrastructure and the Environment

Amendment of list with containment measures for activities involving the contained use of GM plants

COGEM report CGM/160421-03

1. Introduction

When activities are carried out with genetically modified (GM) plants under contained use, it must be prevented that introduced sequences are dispersed in the environment. A number of general measures have been drawn up for this purpose.¹ The space in which work is done with the GM plants, for example, must meet certain conditions and any waste which contains plant reproductive parts must be made inactive.

Based on the characteristics of a plant species it is also laid down whether other containment measures in addition to the general containment measures are necessary to prevent the distribution of the sequences. This means checking whether the species is found in the Netherlands or if it could establish itself here. It must also be considered whether related species are found in the Netherlands that the species could hybridise with. If this is the case, additional measures will often be necessary to prevent the dispersal of the introduced sequences through seed, pollen or plant reproductive parts. In determining the necessary containment measures it is assumed that the activities are with plants which have been modified with sequences that do not code for any 'hazardous gene products'.¹ For plants which have been modified with sequences which encode hazardous gene products, a case-by-case assessment will have to be made to determine whether or not additional containment measures are necessary.

Annex 7 to the Netherlands' Genetically Modified Organisms Regulation 2013 includes a list of plant species, the characteristics of these plant species and any additional containment measures which should be taken when working with these species if they have been modified with sequences that do not encode 'hazardous gene products'.² This list was based on previous COGEM reports which in many cases were published some time ago. In 2012 COGEM undertook a limited revision of the list and reconsidered whether additional containment measures were necessary to prevent the spread of seeds and other plant reproductive parts.³ In 2014 COGEM decided also to update the information on pollination types.⁴

¹ According to the definition in the Netherlands' Genetically Modified Organisms Regulation a 'hazardous gene product' is a gene product that may potentially have a toxic, carcinogenic, allergenic, pathogenic or immune-modulating property or a gene product that could help to spread introduced genetic material, or which could lead to an antibiotic resistance that could threaten the use of medicines administered to treat infectious diseases.

In addition, COGEM considers gene products that could increase the fitness of an organism also to be 'hazardous gene products'.

R. Beringen and B. Odé (RAVON, FLORON team) were asked by COGEM to carry out a study which is described in the research report 'Review of plant characteristics for the purpose of the list with containment measures'.⁵ The study concentrated on the following aspects:

- Checking the pollination methods of a large number of speciesⁱⁱ on the list.
- Gathering information about whether sexually compatible relatives are found in the Netherlands.
- Updating the naming of the species on the list.

Based on the research results COGEM discovered that the pollination type, the naming and/or the containment measures of a number of plant species needed to be amended. The list also had to be expanded to include a number of plant species on which COGEM has recently issued advice.^{6,7,8} COGEM has set out and explained the necessary changes below, along with the revised list with containment measures.

2. List with containment measures for mosses

The present list of containment measures mostly covers vascular plants, but some moss species are also included. Mosses reproduce in a different way than vascular plants. This means that for activities with GM mosses different containment measures are necessary to prevent the spread of introduced sequences.^{9,10} COGEM therefore decided to draw up a separate list with containment measures for activities involving GM mosses.

Mosses		Characteristics	Physical containment measures required
Family	Species	Found in the Netherlands ¹	
Funariaceae	<i>Physcomitrella patens</i>	W	Measures to prevent dispersal of spores and vegetative fragments.
Marchantiaceae	<i>Marchantia polymorpha</i>	W	Measures to prevent dispersal of spores and gemmae.

1) W = (wild) included in the Dutch National Flora and Fauna Database.^{11,12}

3. Presence of the species concerned or sexually compatible relatives in the Netherlands

The presence of the species concerned or other closely related species in the Netherlands is an important factor in the consideration of whether additional containment measures are necessary. To ensure that it is clear why certain containment measures are necessary, the revised list with containment measures also includes information about the presence of the species concerned. A distinction has been made between species that occur naturally in the Netherlands (W = wild), species which are cultivated outdoors (F = farmland), garden plants (G = gardens) and species which do not

ⁱⁱ The researchers checked the pollination methods of species that were included on the list as strictly self-pollinating and of species that were included on the list before 2003.

occur in the Netherlands (-). Where species that are not found in the Netherlands could possibly hybridise with species that do occur in the Netherlands, this has been stated in the list.

The researchers used the Dutch National Flora and Fauna Database as their source for whether the species are naturally found in the wild in the Netherlands.⁵ This database includes all species that have been observed in the wild in the Netherlands. Species which cannot form stable populations in the Netherlands and which cannot be counted as among the Dutch flora, may also be found in the database. For example, the database includes Maize and Soybean. Volunteer plants of Maize and Soybean have in rare cases been observed in the Netherlands, but the two species cannot establish themselves in the Netherlands.

4. Changes in pollination methods

Some plant species can be pollinated in more than one way (e.g. insect, wind or self-pollinated). The list with containment measures included a number of plant species that were indicated as self-pollinating. The research report showed that under certain conditions these plant species may also cross-pollinate (through wind or insects).

In addition, it appeared that a number of plant species can be pollinated in a way other than was stated on the list. The pollination type for these plant species has been amended.

5. Name changes

New scientific information may change the views held on the evolutionary relationships between plant species. Plant species are classified into groups on the basis of their relationships. The group or genus to which a plant species belongs can be derived from its name. The genus *Brassica*, for example, includes the species *Brassica napus*, *Brassica rapa* and *Brassica oleracea*. When a plant species is transferred to another group of plants (genus), a number of species are grouped into a separate new family or families are combined, this often leads to a name change.

The researchers used 'The Plant List' to check the names on the list with containment measures.¹³ This website provides information on the current ('accepted') and previous species names of plant species and families. The list with containment measures includes a number of plant species and families of plants whose names have changed since they first appeared on the list. These names need to be updated.⁵ To ensure that the name changes are clear, the revised list gives the old name as a synonym.

Changes to the names of plant species may have resulted in the same plant species appearing on the list (incorrectly) under both the new name and an old name. This was the case for *Citrullus lanatus* (syn. *Citrullus vulgaris*), *Lotus corniculatus* (syn. *Lotus japonicus*) and *Delphinium elatum* (syn. *Delphinium belladonna*).

Two other plant species turned out to be incorrectly considered as the same plant species: *Rorippa islandica* and *Rorippa palustris* are now listed separately.

Apart from the species names, the list of containment measures also includes a number of trade names. This relates to the ornamental plants 'Brachyscome melanophora', 'Brachyscome multiflora',

‘*Sanvitalia speciosa*’, ‘*Solidago hybride*’, ‘*Sutera diffusa*’ and the various *Rosa* cultivar groups. Ornamental plants are the result of a breeding process which often takes many years in which various species are crossed with one another. When several species have contributed to the creation of a new ornamental plant, that plant can generally no longer be attributed to a particular species. This is why an ornamental plant of this type cannot be referred to by a species name, so the trade name has to be used.

In the case of species, the characteristics of the plants belonging to that species are well documented. The characteristics are not always as well described for plants that are referred to by a given trade name. To be able to determine the necessary containment measures, it is necessary to know the characteristics of the plants that will be genetically modified. It would therefore be desirable for the species to which the plants belong to be stated in permit applications. If this is not possible, other names could also be used provided that the characteristics relevant for determining the necessary containment measures are properly documented.

The revised list makes a distinction between species names and trade names. Species names are shown in italics, as is customary. Trade names are not in italics and have quotation marks around them.

6. Establishing containment measures for species and not for genera

In addition to species and trade names, the list also includes containment measures for numerous genera. The genera on the list include at least nine (*Zantedeschia* spp.) and up to as many as 1617 species (*Begonia* spp.). Only those species which belonged to the genus at that point in time were considered when assessing the necessary containment measures. When new information becomes available views on the relationships between species can change and species may be transferred to another genus. This happens on a regular basis. For example, in the most recent edition of *Flora van Nederland* [Dutch Flora] the genus of 40 species has changed compared with the previous edition.¹⁴

When a species becomes a member of a genus that is on the list and this species has different characteristics than the other species in the genus, then the containment measures previously laid down may be insufficient to prevent the dispersal of the introduced sequences. COGEM takes the view, therefore, that containment measures should be prescribed per species and not for a genus. Therefore COGEM will only give advice on containment measures per species in future. In due course, genera will also be removed from the list if this is considered desirable based on environmental safety considerations. The relevant species from the removed genera will instead be placed on the list with containment measures.

7. Changes in containment measures

There are various factors which affect whether or not to recommend that additional containment measures be instituted. It was considered for each separate species whether additional containment measures are necessary. Various aspects were taken into account, such as the centres of origin, the chances of survival and establishment, the occurrence of the species itself, the presence of sexually compatible species, the possibility of seed development and germination. For crops it was also considered whether the introduced sequences could end up in the harvested product. Because the foregoing aspects differ for each species, it has to be assessed for each individual species whether the

combination of factors make it necessary to have additional containment measures. In general, it may be said that when a species is native (i.e. part of the Dutch flora), containment measures will always be necessary. For a species which is unable to grow in the Netherlands, containment measures will only be necessary when there are species found in the Netherlands which could hybridise with that species (and produce offspring).

If additional measures are deemed necessary, it will be important to consider what measures are required. In general, for native species which are insect pollinated, measures will be necessary to prevent insect pollination and for native wind-pollinated species, measures will be required to prevent wind pollination. When a species can, in theory, be pollinated in several ways, an estimate has to be made of the probability of the various different pollination methods actually occurring in practice.

Because the study brought to light new information about the characteristics of a number of plant species, it was again considered whether additional containment measures are necessary. In this context, it was assumed that the GM plants would be modified with sequences that do not encode 'hazardous gene products'. If plants are modified with such sequences, it will have to be considered whether extra containment measures are required.

8. Revised list with containment measures for GM vascular plants

COGEM has incorporated the changes described above into the revised list with containment measures. These changes will ensure that when working with GM plants under contained use the spread of introduced sequences and any environmental risks arising from this will be adequately prevented. COGEM's advice to the Ministry is that the changes in Annex 7 should be adopted to safeguard environmental safety. Where GM plants have been modified with sequences which encode a 'hazardous gene product', additional containment measures may be necessary.

References

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List of additional containment measures for activities involving GM vascular plants under 'contained use'

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
Alstroemeriaceae	<i>Alstroemeria</i> spp.	I(B)	G/F	-	+	No		Pollination type changed. <i>Alstroemeria</i> species are insect pollinated. Elsewhere also pollinated by hummingbirds.
Amaranthaceae (previously Chenopodiaceae)	<i>Beta vulgaris</i>	W/I	W	+	+	No		Family name changed and pollination type adjusted. <i>B. vulgaris</i> pollen can be dispersed not only by the wind but also by insects. ^{1,2}
	<i>Spinacia oleracea</i>	W	W	+	+	No		Family name changed.
Amaryllidaceae (previously in Alliaceae)	<i>Allium ampeloprasum</i> (syn. <i>Allium porrum</i>)	I	W	-	+	Yes	Wind dispersal: seeds are 'ejected' by plant.	Family name changed. The <i>Allium</i> genus has been classified with the Amaryllidaceae.
Amaryllidaceae (previously in Alliaceae)	<i>Allium cepa</i>	I	W	-	+	Yes	Wind dispersal: seeds are 'ejected' by plant.	Family name changed. The <i>Allium</i> genus has been classified with the Amaryllidaceae.
Amaryllidaceae (previously in Alliaceae)	<i>Allium sativum</i>	I	F (sterile)	-	-	No		Family name changed. The <i>Allium</i> genus has been classified with the Amaryllidaceae.
Amaryllidaceae	<i>Narcissus</i> spp.	I	W	-	+	No		
Apiaceae	<i>Anthriscus sylvestris</i>	I	W	-	+	No		
	<i>Carum</i> spp.	I	W	-	+	No		
	<i>Daucus carota</i>	I	W	-	+	Yes	Fruit has hooked thorns, small seeds.	
Apocynaceae	<i>Catharanthus roseus</i>	*	-	-	-	No		
	<i>Tabernaemontana pandacaqui</i>	*	-	-	-	No		Species name corrected.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
Araceae	<i>Anthurium andraeanum</i>	<i>I</i>	-	-	-	No		Species name corrected and containment measures changed. <i>A.andraeanum</i> is a houseplant in the Netherlands with no sexually compatible relatives. Containment measures are therefore not necessary.
	<i>Dieffenbachia</i> spp.	<i>I</i>	-	-	-	No		
	<i>Lemna gibba</i>	<i>SP/I/W</i>	<i>W</i>	+	+	Yes	Duckweed: small seeds and (floating) reproductive plant structures (turions).	
	<i>Lemna minor</i>	<i>SP/I/W</i>	<i>W</i>	+	+	Yes	Duckweed: small seeds and (floating) reproductive plant structures (turions).	
	<i>Spirodela polyrhiza</i>	<i>SP/I/W</i>	<i>W</i>	+	+	Yes	Duckweed: small seeds and (floating) reproductive plant structures.	
	<i>Spirodela punctata</i> (syn. <i>Landoltia punctata</i>)	<i>SP/I/W</i>	<i>W</i>	+	+	Yes	Duckweed: small seeds and (floating) reproductive plant structures.	Species name corrected.
	<i>Wolffia globosa</i>	<i>SP/I/W</i>	- (wild relatives)	+	+	Yes	Duckweed: small seeds and (floating) reproductive plant structures.	
	<i>Zantedeschia</i> spp.	<i>I</i>	<i>G/F</i>	-	+	No		
Araliaceae	<i>Schefflera</i> spp.	<i>I</i>	-	-	-	No		
Asparagaceae	<i>Hosta</i> spp.	<i>I</i>	<i>W</i>	-	+	No		
	<i>Hyacinthoides</i> spp.	<i>I</i>	<i>W</i>	-	+	No		
	<i>Hyacinthus orientalis</i>	<i>I</i>	<i>W</i>	-	+	No		
Balsaminaceae	<i>Impatiens</i> spp.	<i>I</i>	<i>W</i>	-	+	Yes	Fruit ejects the seeds.	
Begoniaceae	<i>Begonia grandis</i>	<i>I</i>	<i>G</i>	-	+	Yes	Small seeds.	

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
	<i>Begonia</i> spp. (with the exception of <i>B. grandis</i>)	<i>I</i>	<i>G</i>	-	+	No		
Brassicaceae	<i>Arabidopsis thaliana</i>	<i>SP/I</i>	<i>W</i>	-	+	Yes	Small seeds.	
	<i>Boechera holboellii</i> (syn. <i>Arabis holboellii</i>)	<i>A/SP/I</i>	-	-	-	Yes	Pod that springs open with small seeds.	
	<i>Boechera stricta</i> (syn. <i>Arabis drummondii</i>)	<i>A/SP/I</i>	-	-	-	Yes	Pod that springs open with small seeds.	
	<i>Brassica</i> spp.	<i>SP/I</i>	<i>W</i>	-	+	Yes	Small seeds, ejected when in contact with ripe fruit.	
	<i>Camelina sativa</i>	<i>SP/I</i>	<i>W</i>	-	+	Yes	Small seeds that are ejected.	Addition of species on which advice was recently given.
	<i>Crambe hispanica</i> subsp. <i>abyssinica</i> (syn. <i>Crambe abyssinica</i>)	<i>SP/I</i>	<i>W</i>	-	+	No		Species name changed.
	<i>Diplotaxis tenuifolia</i>	<i>I/W</i>	<i>W</i>	+	+	Yes	Fruit can burst open to allow seeds to drop onto the ground.	
	<i>Draba alyssoides</i>	<i>SP/I</i>	- (wild relatives)	-	+	No		
	<i>Draba aretioides</i>	<i>SP/I</i>	- (wild relatives)	-	+	No		Species name corrected.
	<i>Draba fladnizensis</i>	<i>SP/I</i>	- (wild relatives)	-	+	No		
	<i>Draba hookeri</i>	<i>SP/I</i>	- (wild relatives)	-	+	No		
	<i>Draba lactea</i>	<i>SP/I</i>	- (wild relatives)	-	+	No		
	<i>Draba muralis</i>	<i>SP/I</i>	<i>W</i>	-	+	Yes	Seeds held in capsule that springs open.	
	<i>Draba nivalis</i>	<i>SP/I</i>	-	-	+	No		

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
			(wild relatives)					
	<i>Draba steyermarkii</i>	SP/I	- (wild relatives)	-	+	No		
	<i>Draba subcapitata</i>	SP/I	- (wild relatives)	-	+	No		
	<i>Erophila verna</i> (syn. <i>Draba verna</i>)	SP/I	W	-	+	Yes	Small seeds.	Species name corrected.
	<i>Eutrema halophilum</i> (syn. <i>Thellungiella halophila</i>)	SP/I	-	-	-	Yes	Small seeds.	Species name changed.
	<i>Raphanus raphanistrum</i> subsp. <i>sativus</i> (syn. <i>Raphanus sativus</i>)	SP/I	W	-	+	No		Species name corrected.
	<i>Rorippa amphibia</i> (syn. <i>Nasturtium amphibia</i>)	I	W	-	+	No		Species name corrected and pollination type adjusted. Great yellowcress is insect pollinated. Great yellowcress is not self-compatible and cannot pollinate itself. ³
	<i>Rorippa islandica</i>	SP/I	W	-	+	No		Species added to list. <i>Rorippa islandica</i> and <i>R. palustris</i> (Marsh yellowcress) were previously wrongly considered the same species.
	<i>Rorippa palustris</i>	SP/I	W	-	+	No		Species added to list. <i>R. palustris</i> (Marsh yellowcress) and <i>Rorippa islandica</i> were previously wrongly considered the same species.
	<i>Rorippa sylvestris</i> (syn. <i>Nasturtium sylvestre</i>)	I	W	-	+	No		Species name corrected and pollination type adjusted. Creeping yellowcress is insect pollinated. Creeping yellowcress is not self-compatible and cannot pollinate itself. ³
	<i>Sinapis</i> spp.	SP/I	W	-	+	Yes	Small seeds, ejected when in contact with ripe fruit.	
	<i>Thlaspi caerulescens</i>	SP/I	W	-	+	No		
Cannabaceae	<i>Cannabis sativa</i>	W/I	W	+	+	No		Containment measures adjusted. <i>C. sativa</i>

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
				(only for male inflorescences)	(only for male inflorescences)			is dioecious. This means that male and female inflorescences occur on different plants. It is necessary to have measures to prevent wind and insect pollination only for plants with male inflorescences.
	<i>Parasponia andersonii</i>	W/I	-	-	-	No		
	<i>Trema orientalis</i>	SP/I/W	-	-	-	No		
	<i>Trema tomentosa</i>	SP/I/W	-	-	-	No		
Caryophyllaceae	<i>Dianthus</i> spp.	I	W	-	+	No		Pollination type adjusted and containment measures amended. <i>Dianthus</i> species are insect pollinated and in the Netherlands are able to develop seed. There are various native <i>Dianthus</i> species in the Netherlands. Measures to prevent insect pollination are therefore necessary.
	<i>Gypsophila paniculata</i>	I	W	-	+	No		Pollination type adjusted and containment measures amended. Common gypsophila is insect pollinated and in the Netherlands can develop seeds. <i>Gypsophila paniculata</i> can grow in the wild in the Netherlands. Measures to prevent insect pollination are therefore necessary.
Cleomaceae (previously in Brassicaceae)	<i>Cleome spinosa</i>	SP/I	G	-	+	No		Family name changed. The <i>Cleome</i> genus has been classified with the Cleomaceae.
Compositae (previously Asteraceae)	<i>Artemisia</i> spp.	W/I/ZP	W	+	+	Yes	Small seeds.	Family name changed and pollination type adjusted. There are <i>Artemisia</i> species which can be pollinated not only by the wind but also by insects or self-pollinate.
	<i>Bidens ferulifolia</i>	I	G	-	+	No		Family name changed and species name corrected.
	' <i>Brachyscome melanophora</i> '	I	G	-	+	No		Family name changed and notation of

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
								trade name amended.
	‘Brachyscome multiflora’	<i>I</i>	<i>G</i>	-	+	No		Family name changed and notation of trade name amended.
	<i>Chrysanthemum</i> × <i>morifolium</i> (syn. <i>Dendranthema</i> × <i>grandiflora</i>)	*	-	-	-	No		Family name changed and species name corrected.
	<i>Cichorium</i> spp.	<i>I/ZP</i>	<i>W</i>	-	+	No		Family name changed and pollination type adjusted. There are Chicory species which can be pollinated not only by the wind but also by insects or self-pollinate (including Endive (<i>Cichorium endivia</i>)).
	<i>Gerbera jamesonii</i>	*	-	-	-	No		Family name changed.
	<i>Helianthus annuus</i>	<i>SP/I</i>	<i>F</i>	-	+	No		Family name changed and species name corrected.
	<i>Jacobaea vulgaris</i> subsp. <i>vulgaris</i>	<i>I</i>	<i>W</i>	-	+	Yes	Seeds with pappus.	Family name changed.
	<i>Jacobaea vulgaris</i> subsp. <i>dunensis</i>	<i>I</i>	<i>W</i>	-	+	Yes	Seeds with pappus.	Family name changed.
	<i>Lactuca</i> spp.	<i>SP/I</i>	<i>W</i>	-	+	Yes	Seeds with pappus.	Family name changed.
	<i>Pilosella caespitosa</i> (syn. <i>Hieracium caespitosum</i>)	<i>SP/I</i>	<i>W</i>	-	+	Yes	Seeds with pappus.	Family and species name changed.
	‘Sanvitalia speciosa’	<i>I</i>	<i>G</i>	-	+	No		Family name changed and notation of trade name amended.
	‘Solidago hybride’	<i>I</i>	<i>G</i>	-	+	Yes	Small wind-dispersed seeds.	Family name changed and notation of trade name amended. Pollination method changed and containment measures amended. ‘Solidago hybride’ is insect pollinated. There are no indications that wind pollination also takes place. Measures to prevent wind pollination are therefore not necessary.
	<i>Tanacetum cinerariifolium</i>	<i>I</i>	<i>G</i>	-	+	Yes	Loose seeds.	Family name changed.
	<i>Taraxacum campyloides</i> (syn. <i>Taraxacum officinale</i>)	<i>I/A</i>	<i>W</i>	-	+	Yes	Seeds with pappus.	Family and species name changed. Pollination type changed. The most prevalent dandelion plants in the Netherlands are apomictic. ⁴

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
	<i>Taraxacum kok-saghyz</i>	I/SP/W	- (wild relatives)	-	+	Yes	Seeds with pappus.	Addition of species on which advice was recently given.
Crassulaceae	<i>Kalanchoe blossfeldiana</i>	SP/I/(B)	-	-	-	No		Pollination type adjusted and containment measures amended. <i>K. blossfeldiana</i> can self-pollinate. <i>K. blossfeldiana</i> can also be pollinated by insects and (elsewhere) by hummingbirds. ⁵ In the Netherlands <i>K. blossfeldiana</i> is a house plant with no sexually compatible relatives. Containment measures are therefore not necessary.
Cucurbitaceae	<i>Citrullus lanatus</i> (syn. <i>Citrullus vulgaris</i>)	I	G	-	+	No		Species name changed. <i>C. lanatus</i> and <i>C. vulgaris</i> are different names for the same species.
	<i>Cucumis</i> spp.	I	W	-	+	No		
	<i>Cucurbita</i> spp.	I	W	-	+	No		
	<i>Momordica balsamina</i>	I	-	-	-	No		Species name corrected and containment measures changed. <i>M. balsamina</i> cannot survive outdoors in the Netherlands and has no sexually compatible relatives in the Netherlands. Containment measures are therefore not necessary. ⁶
	<i>Momordica charantia</i>	I	-	-	-	No		Containment measures changed. <i>M. charantia</i> cannot survive outdoors in the Netherlands and has no sexually compatible relatives in the Netherlands.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
								Containment measures are therefore not necessary. ⁶
	<i>Momordica cochinchinensis</i>	<i>I</i>	-	-	-	No		Containment measures changed. <i>M. cochinchinensis</i> cannot survive outdoors in the Netherlands and has no sexually compatible relatives in the Netherlands. Containment measures are therefore not necessary. ⁶
Droseraceae	<i>Drosera</i> spp.	<i>I</i>	<i>W</i>	-	+	Yes	Small seeds.	
Euphorbiaceae	<i>Jatropha curcas</i>	<i>I</i>	-	-	-	No		
	<i>Manihot esculenta</i>	*	-	-	-	No		Species name corrected.
Fagaceae	<i>Quercus robur</i>	<i>W/I</i>	<i>W</i>	+	+	No		Pollination type changed. Pedunculate oak can be pollinated not only by the wind but also by insects. ⁷
Geraniaceae	<i>Geranium pyrenaicum</i>	<i>I/SP</i>	<i>W</i>	-	+	Yes	Achenes that can be ejected away from plant.	Addition of species on which advice was recently given.
	<i>Geranium robertianum</i>	<i>I/SP</i>	<i>W</i>	-	+	Yes	Achenes with fibrous threads that can be ejected.	Addition of species on which advice was recently given.
	<i>Pelargonium</i> spp.	<i>I</i>	<i>G</i>	-	+	No		
Gesneriaceae	<i>Saintpaulia ionantha</i>	*	-	-	-	No		Family name corrected.
Goodeniaceae	<i>Scaevola aemula</i>	<i>I</i>	<i>G</i>	-	+	No		Pollination type adjusted and containment measures changed. <i>S. aemula</i> is insect pollinated. There are no indications that wind pollination also takes place. Measures to prevent wind pollination are therefore not necessary.
Hydrangeaceae	<i>Hydrangea macrophylla</i>	<i>I</i>	<i>W</i>	-	+	No		Pollination type adjusted and containment measures changed. Some <i>H. macrophylla</i> types have fertile flowers. These flowers are insect pollinated. <i>H. macrophylla</i> is also occasionally

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
								found in the wild in the Netherlands. Measures to prevent insect pollination are therefore necessary.
Hypericaceae	<i>Hypericum</i> spp.	I/SP	W	-	+	Yes	Small seeds.	Family name corrected. Pollination type adjusted and containment measures changed. <i>Hypericum</i> species are insect pollinated but are also capable of self-pollination. There are no indications that wind pollination also takes place. Measures to prevent wind pollination are therefore not necessary.
Iridaceae	<i>Freesia</i> spp.	*	-	-	-	No		
	<i>Gladiolus</i> spp.	I	F	-	+	No		Pollination type adjusted and containment measures changed. <i>Gladiolus</i> species are insect pollinated. Gladioli are cultivated outdoors in the Netherlands and can develop seeds. ⁸ Measures to prevent insect pollination are therefore necessary.
	<i>Iris</i> spp.	I	W	-	+	No		
Lamiaceae	<i>Lavandula</i> spp.	I	W	-	+	No		
	<i>Mentha</i> spp.	I	W	-	+	Yes	Small seeds.	
	<i>Scutellaria baicalensis</i>	I	G	-	+	No		
Leguminosae (previously Fabaceae)	<i>Glycine max</i>	SP/I	F/W	-	-	No		Family name changed and pollination type adjusted.
	<i>Lotus corniculatus</i> (syn. <i>Lotus japonicus</i>)	I	W	-	+	Yes	Pod ejects seeds when ripe.	Family and species name changed. <i>L. corniculatus</i> and <i>L. japonicus</i> are different names for the same species.
	<i>Medicago truncatula</i>	SP/I	- (no sexually compatible relatives)	-	-	No		Family name changed and pollination type adjusted. <i>M. truncatula</i> is considered to be self-pollinating but can also be insect pollinated.
	<i>Medicago x varia</i>	I	W	-	+	No		Family name changed.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
	<i>Phaseolus</i> spp.	SP/I	W	-	+	No		Family name changed.
	<i>Pisum sativum</i>	SP/I	W	-	+	No		Family name changed.
	<i>Trifolium repens</i>	I	W	-	+	Yes	Small seeds.	Family name changed.
	<i>Vicia faba</i>	SP/I	W	-	+	No		Family name changed.
	<i>Vicia hirsuta</i>	I	W	-	+	Yes	Pod ejects seeds when ripe.	Family name changed.
	<i>Vigna unguiculata</i>	SP/I	G	-	+	No		Family name changed.
Liliaceae	<i>Lilium</i> spp.	I	W/F	-	+	No		Pollination type adjusted and containment measures changed. Lily species are insect pollinated. Some lily species are found in the wild in the Netherlands. Lily species are also cultivated outdoors. It is possible to collect seed. ⁹ For the above reasons measures to prevent insect pollination are necessary.
	<i>Tulipa</i> spp.	I	W	-	+	No		
Linaceae	<i>Linum usitatissimum</i>	SP/I	W	-	+	No		
Linderniaceae (previously Scrophulariaceae)	<i>Craterostigma plantagineum</i>	I	-	-	-	No		Family name changed. The <i>Craterostigma</i> genus has been classified with the <i>Linderniaceae</i> . Pollination type changed. <i>C. plantagineum</i> is insect pollinated. There are no indications that <i>C. plantagineum</i> can pollinate itself.
Malvaceae	<i>Gossypium hirsutum</i>	I	-	-	+	No		
Malvaceae (previously in Sterculiaceae)	<i>Theobroma cacao</i>	I/SP	-	-	-	No		Family name changed. The <i>Theobroma</i> genus has been classified with the <i>Malvaceae</i> . Pollination type changed. <i>T. cacao</i> is mostly insect pollinated but is also capable of self-pollination.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
Marantaceae	<i>Calathea roseopicta</i>	I/SP	-	-	-	No		Pollination type adjusted and containment measures changed. <i>C. roseopicta</i> is not only insect pollinated but can also pollinate itself. In the Netherlands <i>C. roseopicta</i> is a house plant with no sexually compatible relatives. Containment measures are therefore not necessary.
Moraceae	<i>Ficus</i> spp.	I/A	W	-	-	No		Pollination type changed. <i>Ficus</i> species are insect pollinated. There are <i>Ficus</i> species which are apomictic. ¹⁰
Musaceae	<i>Musa</i> spp.	*	-	-	-	No		
Nyctaginaceae	'Bougainvillea vera'	I	-	-	-	No		Notation of trade name amended and containment measures changed. 'Bougainvillea vera' is a container/pot plant with no sexually compatible relatives. Containment measures are therefore not necessary.
Onagraceae	<i>Fuchsia hybrida</i>	I/(B)	G	-	+	No		Pollination type adjusted and containment measures changed. Elsewhere <i>F. hybrida</i> is pollinated by hummingbirds, but it can also be pollinated by insects. Measures to prevent insect pollination are necessary.
Plantaginaceae	<i>Antirrhinum majus</i>	I	W	-	+	No		
Poaceae	<i>Agrostis capillaris</i> (syn. <i>Agrostis tenuis</i>)	W	W	+	-	Yes	Small seeds.	Species name changed.
	<i>Agrostis stolonifera</i>	W	W	+	-	Yes	Small seeds.	Species name corrected.
	<i>Dactylis glomerata</i>	W	W	+	-	Yes	Small seeds.	
	<i>Festuca</i> spp.	W	W	+	-	Yes	Small seeds.	
	<i>Hordeum vulgare</i>	SP/W	W	+	-	No		
	<i>Lolium</i> spp.	W	W	+	-	Yes	Small seeds.	
	<i>Oryza sativa</i>	SP/W/I	-	-	-	No		Pollination type changed. <i>O. sativa</i> is considered to be self-pollinating but can also be pollinated by the wind or insects.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
	<i>Phleum pratense</i>	W	W	+	-	Yes	Small seeds.	
	<i>Poa pratensis</i>	SP/A/W	W	+	-	Yes	Small seeds.	
	<i>Poa trivialis</i>	W	W	+	-	Yes	Small seeds.	
	<i>Triticum aestivum</i>	SP/W	W	+	-	No		
	<i>Triticum durum</i> (syn. <i>Triticum turgidum</i> subsp. <i>durum</i>)	SP/W	F	+	-	No		Species name corrected.
	<i>Zea mays</i>	W/SP	F/W	-	-	No		
Polemoniaceae	<i>Phlox paniculata</i>	I	G	-	+	No		
Polygonaceae	<i>Rumex palustris</i>	W	W	+	-	No		Containment measures changed. Marsh Dock is wind pollinated and is not visited by insects. Measures to prevent insect pollination are therefore not necessary
Primulaceae	<i>Cyclamen persicum</i>	I	- (related garden plants)	-	+	No		
Ranunculaceae	<i>Delphinium elatum</i> (syn. <i>Delphinium belladonna</i>)	I	G/F	-	+	No		Species name changed. <i>D. elatum</i> and <i>D. belladonna</i> are different names for the same species.
Rosaceae	<i>Fragaria</i> spp.	SP/I	W	-	+	No		
	<i>Malus</i> spp.	I/W	W	+	+	No		Pollination type adjusted and containment measures changed. <i>Malus</i> species are insect pollinated. <i>M. domestica</i> can also be pollinated by the wind. ¹¹ Besides measures to prevent insect pollination, measures to prevent wind pollination are therefore necessary.
	<i>Pyrus</i> spp.	I/W	W	+	+	No		Pollination type adjusted and containment measures changed. <i>Pyrus</i> species are insect pollinated. <i>P. communis</i> can also be pollinated by the wind. ¹² Besides measures to prevent insect pollination, measures to prevent wind pollination are therefore also necessary.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
	<i>Rosa</i> cultivar groups: divided into <i>Rosa</i> cultivar group Climbing floribunda <i>Rosa</i> cultivar group Climbing Grandiflora <i>Rosa</i> cultivar group Climbing Hybrid Tea <i>Rosa</i> cultivar group Climbing Miniature <i>Rosa</i> cultivar group Climbing Polyantha <i>Rosa</i> cultivar group Floribunda <i>Rosa</i> cultivar group Grandiflora <i>Rosa</i> cultivar group Hybrid Kordesii <i>Rosa</i> cultivar group Hybrid Moyesii <i>Rosa</i> cultivar group Hybrid Musk <i>Rosa</i> cultivar group Hybrid Rugosa <i>Rosa</i> cultivar group Hybrid Tea <i>Rosa</i> cultivar group Hybrid Wichurana <i>Rosa</i> cultivar group Large Flowered Climber <i>Rosa</i> cultivar group Miniature <i>Rosa</i> cultivar group Mini Flora <i>Rosa</i> cultivar group Polyantha	*	W	-	-	No		Notation of trade names changed.
Rubiaceae	<i>Bouvardia</i> spp.	*	-	-	-	No		
Rutaceae	<i>Citrus</i> spp.	I/SP/(B)	-	-	-	No		Pollination type adjusted and containment measures changed. <i>Citrus</i> species are insect pollinated but some <i>Citrus</i> species are also capable of self-pollination. Some <i>Citrus</i> species elsewhere are also visited by hummingbirds. <i>Citrus</i> species are grown in the Netherlands as container/pot plants. No sexually compatible relatives are found in

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
								the Netherlands. Containment measures are therefore not necessary.
Salicaceae	<i>Salix alba</i>	I/W	W	+ (only for male inflorescences)	+ (only for male inflorescences)	Yes (only for plants with female inflorescences)	Seeds with pappus.	Containment measures changed. Species belonging to the Salicaceae family are dioecious. This means that male and female inflorescences occur on different plants. Only for plants with male inflorescences is it necessary to have measures to prevent wind and insect pollination. Measures to prevent seed dispersal are only necessary for plants with female inflorescences.
	<i>Salix babylonica</i> (syn. <i>Salix matsudana</i>)	I/W	W	+ (only for male inflorescences)	+ (only for male inflorescences)	Yes (only for plants with female inflorescences)	Seeds with pappus.	Species name changed. Pollination type adjusted and containment measures changed. <i>S. babylonica</i> can be both insect pollinated and wind pollinated. <i>S. babylonica</i> is found in the wild in some parts of the Netherlands (e.g. as seedling). ¹³ For the above reasons measures are necessary to prevent insect and wind pollination. Species belong to the <i>Salicaceae</i> family are dioecious This means that male and female inflorescences occur on different plants. Only for plants with male inflorescences is it necessary to have measures to prevent wind and insect pollination. Measures to prevent seed dispersal are necessary only for plants with female inflorescences.
Scrophulariaceae	'Sutera diffusa'	I	W	-	+	No		Notation of trade name changed.
Solanaceae	<i>Capsicum annuum</i>	I	W	-	+	No		
	<i>Lycopersicon pennellii</i> (syn. <i>Solanum pennellii</i>)	SP/I/W	- (sexually	-	+	No		Species name changed and pollination type adjusted. <i>L. pennellii</i> is self-

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
			<i>compatible relative of S. lycopersicum</i>)					pollinating but in the field insect and wind pollination are also possible. The probability of <i>L. pennellii</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Nicotiana</i> spp.	SP/I/(B)	W	-	+	Yes	Small seeds.	Pollination type adjusted and containment measures changed. Various Tobacco species are found in the Netherlands. Tobacco (<i>N. tabacum</i>) is considered to be self-pollinating but can also be pollinated by insects. A cross-pollination percentage of 4-10% has been reported. Elsewhere some tobacco species are visited by birds. Measures to prevent insect pollination are necessary.
	<i>Petunia hybrida</i>	SP/I/(B)	W	-	+	Yes	Small seeds.	Pollination type adjusted and containment measures changed. <i>P. hybrida</i> is known to be self-pollinating but some <i>P. hybrida</i> cultivars are not self-compatible. They can be pollinated by insects and elsewhere by hummingbirds. <i>P. hybrida</i> is only occasionally found in the wild in the Netherlands. ¹⁴ For the above reasons measures to prevent insect pollination are necessary. <i>P. hybrida</i> develops minute seeds. ¹⁵ Additional measures are therefore necessary to prevent the seed spreading.
	<i>Salpiglossis sinuata</i>	I/SP	G	-	+	No		Pollination type adjusted and containment measures changed. <i>S. sinuata</i> is insect pollinated although some flowers can self-pollinate. Given the above, measures

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
								are necessary to prevent insect pollination.
	<i>Solanum americanum</i> (syn. <i>Solanum nigrum</i>)	SP/I/W	W	-	+	No		Species name changed and pollination type adjusted. Besides self-pollination and insect pollination, wind pollination is also possible. The probability of <i>S. americanum</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Solanum bulbocastanum</i>	I/W	- (no sexually compatible relatives)	-	-	No		Pollination type changed. <i>S. bulbocastanum</i> is insect pollinated. ¹⁶ The pollen of <i>S. bulbocastanum</i> can also be dispersed by the wind.
	<i>Solanum chmielewskii</i>	SP/I/W	- (sexually compatible relative of <i>S. lycopersicum</i>)	-	+	No		Pollination type changed. Besides self-pollination and insect pollination, wind pollination is also possible. The probability of <i>S. chmielewskii</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Solanum dulcamara</i>	SP/I/W	W	-	+	No		Pollination type changed. Besides self-pollination and insect pollination, wind pollination is also possible. The probability of <i>S. dulcamara</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
	<i>Solanum habrochaites</i>	I/W	- (sexually compatible relative of <i>S. lycopersicum</i>)	-	+	No		Pollination type changed. <i>S. habrochaites</i> is insect pollinated. The pollen of <i>S. habrochaites</i> can also be dispersed by the wind. <i>S. habrochaites</i> is not self-compatible and therefore cannot self-pollinate. The probability of <i>S. habrochaites</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Solanum lycopersicum</i>	SP/I/W	W	-	+	No		Pollination type adjusted and containment measures changed. Tomato is known to be self-pollinating but can also be insect pollinated. Tomato pollen can also be dispersed by the wind. The probability of <i>S. lycopersicum</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Solanum melongena</i>	SP/I/W	G	-	+	No		Pollination type changed. <i>S. melongena</i> is self-compatible and can self-pollinate. Insect and wind pollination are also both possible. The probability of <i>S. melongena</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Solanum peruvianum</i>	I/W	-	-	+	No		Pollination type changed.

Vascular plants		Characteristics		Physical containment measures required				Changes relative to previous list
Family	Species/Genus	Pollination ¹	Found in the Netherlands ²	Prevent wind pollination	Prevent insect pollination	Additional measures necessary for seeds and soil	Reason for measure	
			(sexually compatible relative of <i>S. lycopersicum</i>)					<i>S. peruvianum</i> is insect pollinated. The pollen of <i>S. peruvianum</i> can also be dispersed by the wind. <i>S. peruvianum</i> is not self-compatible and therefore cannot self-pollinate. The probability of <i>S. peruvianum</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Solanum</i> spp.	SP/I/W	W	-	+	No		Pollination type changed. Some <i>Solanum</i> species are self-compatible and can self-pollinate. The pollen of <i>Solanum</i> species can be dispersed by insects and by wind. The probability of <i>Solanum</i> plants kept in a greenhouse fertilizing plants outside the greenhouse due to wind is negligibly small. Measures to prevent wind pollination are therefore not necessary. Measures to prevent insect pollination are necessary.
	<i>Solanum tarijense</i>	SP/I/W	-	-	-	No		Pollination type changed. Besides self-pollination and insect pollination, wind pollination is also possible.
	<i>Solanum tuberosum</i>	SP/I/W	W	-	-	No		
	<i>Solanum verrucosum</i>	SP/I/W	-	-	-	No		Pollination type changed. <i>S. verrucosum</i> is self-pollinating but can be pollinated also by wind and insects.
Vitaceae	<i>Vitis vinifera</i>	SP/I/W	W	+	+	Yes	Small pollen grains and vegetative reproduction also possible through rhizomes.	

1) Pollination: A = apomictic, I = insect pollination, B = bird pollination, W = wind pollination, SP = self-pollination, * = no seeds can develop under Dutch conditions.

2) Found in the Netherlands: W = (wild) included in the National Flora and Fauna Database¹⁷, F = (farmland) is cultivated in the Netherlands, G = (garden) found in gardens, - = not found outdoors in the Netherlands.

To draw up the list COGEM consulted a great many different sources such as scientific publications,¹⁸ floras,^{19,20} seed atlases,²¹ internet sites with information on the naming of plant species,²² on specific plant species²³ or on seed characteristics,^{24,25,26} fact sheets,²⁷ databases,²⁸ and other sources of information.²⁹

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