



## **NAPPO Regional Standards for Phytosanitary Measures (RSPM)**

### **RSPM No. 29**

### **Guidelines for the Petition for Import and Release of Non-*Apis* Pollinating Insects into NAPPO Countries**

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## Review

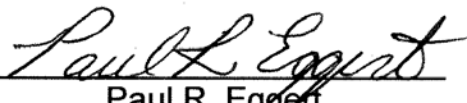
NAPPO Standards for Phytosanitary Measures are subject to periodic review and amendment. The next review for this Standard is October 2013. A review of any NAPPO Standard may be initiated at any time upon the request of a NAPPO member country.

## Approval

This Standard was approved by the North American Plant Protection Organization (NAPPO) Executive Committee on October 20, 2008.

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## Implementation

See the attached implementation plans for implementation dates in each NAPPO country.

## Amendment Record

Amendments to this Standard will be given a consecutive number, dated and filed with the NAPPO Secretariat.

## Distribution

This standard is distributed by the NAPPO Secretariat, to the Industry Advisory Group and Sustaining Associate Members, the International Plant Protection Convention (IPCC) Secretariat, and to other Regional Plant Protection Organizations (RPPOs).

## Introduction

### Scope

These guidelines are intended to assist in preparing a petition for the importation and release of non-*Apis* pollinating insects. A standardized petition for these organisms will assist reviewers and regulators in assessing the risk associated with the importation, movement and release of non-*Apis* pollinating insects into the environment. A petition may not be necessary to import non-*Apis* pollinating insects into a containment facility for the purposes of research. *Apis mellifera* (Linnaeus) and other *Apis* species are excluded from the scope of this guideline.

### References

*Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms.* 2005. ISPM N° 3, FAO, Rome.

*Glossary of Phytosanitary Terms.* 2005. ISPM N° 5, FAO, Rome.

*NAPPO Glossary of Phytosanitary Terms.* 2008. RSPM No.5, NAPPO, Ottawa.

*Guidelines for Construction and Operation of a Containment Facility for Insects and Mites used as Biological Control Agents.* 2004. RSPM No.22, NAPPO, Ottawa.

Buchmann, S. L. and G. P. Nabhan. 1996. *The Forgotten Pollinators.* Island Press. Washington, D.C.

Buttermore, R.E. 1997. Observations of successful *Bombus terrestris* (L.) (Hymenoptera: Apidae) colonies in southern Tasmania. *Australian Journal of Entomology* 36: 251-254.

Colla. S.R., M.C. Otterstatter, R.J. Gegear and J.D. Thomson. 2006. Plight of the bumble bee: Pathogen spillover from commercial to wild populations. *Biological Conservation* 129(4): 461-467.

Dafni, A. and A. Shmida. 1996. The possible implications of the invasion of *Bombus terrestris* L. (Apidae) at Mt. Carmel, Israel. *In* The Conservation of Bees. A. Matheson, S.L. Buchmann, Ch. O'Toole, P. Westrich and I.H. Williams. Linnean Society Symposium Series No 18. Academic Press, London. pp. 183-200.

Flanders, R.V., W. F. Wehling and A. L. Craghead. 2003. Laws and regulation on the import, movement, and release of bees in the United States. *In* Proceedings: For Nonnative Crops, Whence Pollinators of the Future? *Thomas Say Publications in Entomology*, Entomological Society of America. Pgs. 99-111

Goka K., K. Okabe, M. Yoneda and S. Niwa. 2001. Bumblebee commercialization will cause worldwide migration of parasitic mites. *Molecular Ecology* 10:2095-2099.

Hingston, A.B., et al. 2001. Extent of invasion of Tasmanian native vegetation by the exotic bumblebee *Bombus terrestris* (Apoidea: Apidae). *Austral Ecology* 27(2): 162-172.

Hingston, A.B. and P.B. McQuillan. 1998. Does the recently introduced bumblebee *Bombus terrestris* (Apidae) threaten Australian ecosystems? *Australian Journal of Ecology* 23: 39-549.

Hingston, A.B. and P.B. McQuillan. 1999. Displacement of Tasmanian native megachilid bees by the recently introduced bumblebee *Bombus terrestris* (Linnaeus, 1758) (Hymenoptera: Apidae). *Australian Journal of Zoology* 47: 59–65.

Inoue, M.N., J. Yokoyama, and I. Washitani. 2008. Displacement of Japanese native bumblebees by the recently introduced *Bombus terrestris* (L.) (Hymenoptera: Apidae). *Journal of Insect Conservation* 12: 135-146.

Koide, T., et al. 2008. Methods of netting greenhouses to prevent the escape of bumblebees. *Jpn. J. Appl. Entomol. Zool.* 52: 19-26.

Macfarlane, R.P. and L. Gurr. 1995. Distribution of bumble bees in New Zealand. *New Zealand Entomologist.* 18: 29–36.

Mitchener, C.D., et al. 1994. *The Bee Genera of North and Central America.*

National Research Council of the National Academies. 2007. *Status of Pollinators in North America.* National Research Council of the National Academies, The National Academies, Washington, D.C., [www.nap.edu](http://www.nap.edu)

Schmid-Hempel, P., R. Schmid-Hempel, P.C. Brunner, O.D. Seeman and G.R. Allen. 2007. Invasion success of the bumblebee, *Bombus terrestris*, despite a drastic genetic bottleneck. *Heredity.* 99: 414-422.

Semmens, T.D. 1996. Flower visitation by the bumble bee *Bombus terrestris* (L.) (Hymenoptera: Apidae) in Tasmania. *Australian Entomologist.* 23: 33-35.

Stickler, K. and J. H. Cane (Eds.) 2003. *For non-native crops, "Whence Pollinators of the Future?"* Thomas Say Publications in Entomology, Entomological Society of America. Lanham, Maryland.

Torchio, P.F., E. Asensio and R.W. Thorp. 1987. Introduction of the European bee, *Osmia cornuta*, into California almond orchards (Hymenoptera: Megachilidae). *Environmental Entomology* 16: 664-667.

Wehling, W.F. 2002. Risk assessment: importation of adult queens, package bees and germplasm of honey bees; *Apis mellifera* L., from Australia. [https://web01.aphis.usda.gov/oxygen\\_fod/fb\\_md\\_ppq.nsf/0/ce92b6feb0d26cfc852568f6004c6032/\\$FILE/0029.pdf](https://web01.aphis.usda.gov/oxygen_fod/fb_md_ppq.nsf/0/ce92b6feb0d26cfc852568f6004c6032/$FILE/0029.pdf)

Wehling, W. F. and Flanders R.V. 2005. The risks or international trade in bees: laws and regulations on the import, movement and release of bees in the United States. *IN* Bee Research and Virus in Europe: Proceedings of the meeting in Sophia-Antipolis (France) 24-26 April 2005. pgs 301-309.

Winter, K, et al. 2006. Importation of non-native bumble bees into North America: Potential consequences of using *Bombus terrestris* and other non-native bumble bees for greenhouse crop pollination in Canada, Mexico, and the United States. White Paper of the North American Pollinator Protection Campaign (NAPPC), San Francisco, CA.

## Definitions, Abbreviations and Acronyms

containment facility	A structure whose purpose is to prevent escape of material held within it, into the environment (NAPPO)
country/region of production	The country / region where the last complete life cycle of a biological control agent or pollinator occurred prior to final packaging (NAPPO)
non-indigenous	Not native to a particular country, ecosystem or ecoarea (applied to organisms intentionally or accidentally introduced as a result of human activities) (FAO)
import permit	Official document authorizing importation of a commodity in accordance with specified phytosanitary requirements (FAO)
NPPO	National Plant Protection Organization (FAO)
petition	A formal, written application to a regulatory agency seeking approval to release a non-native biological control agent or pollinator into the environment (NAPPO)
pollinator rearing and packaging materials	The hive, nest box, pollen, food source, plant material, and substrate that the pollinators were produced with, some or all of which may be included in the final product (shipment), including packaging materials (NAPPO)
reference specimens	Individual specimen(s) from a specific population conserved in a reference culture collection and, where possible, in publicly available collection(s) (FAO)
release (into the environment)	Intentional liberation of an organism into the environment (FAO)
standard operating procedure (SOP)	Codified best laboratory practices for handling pollinators in quarantine or containment (NAPPO)
TAG	Technical Advisory Group (NAPPO)

## Outline of Requirements

This standard provides information on the steps that each NAPPO country should follow when a petition for the release of pollinating insects is received. Specific guidance is provided on the reasons for petition, pollinator information, region of production of the pollinator, and environmental and economic impacts of the release. It also contains information on the requirement for post-release monitoring to track performance and impacts.

## Background

About three-quarters of the world's flowering plants rely on pollinators to transfer pollen from the male to the female parts of flowers for reproduction. Pollinators are vital to agriculture because most fruit, vegetable, forage, hay and seed crops and other crops are pollinated by animals. Estimating the ecological value of pollinators and pollination and predicting the consequences of their losses are considerably more challenging than estimating their economic value in agriculture. Nevertheless, pollination by animals is essential for maintaining the structure and function of a wide range of natural communities in North America.

In the late 1990s, bee taxonomists started to notice a decline in the abundance and distribution of several bumble bee species in North America. The dramatic decline in wild populations of these species occurred about the time that a disease outbreak was reported in populations of commercially raised *Bombus occidentalis* (Greene), which were distributed for greenhouse pollination in western North America.

The movement of bumble bee colonies has been linked to parasite spread in Japan. Researchers have documented the introduction of novel mites with the reintroduction of previously exported bees, indicating that export of natives for rearing and re-importation may lead to non-indigenous pest introductions. Furthermore, pathogens such as *Nosema bombi* (Fantham & Porter) and *Crithidia bombi* have been shown to occur at higher levels in native populations around greenhouses where commercially produced bumble bees are used for pollination.

Introduction and range expansion of non-native *Bombus terrestris* L. into new habitats has been shown to increase competition among native bee species. In Israel, the introduction of *B. terrestris* was linked to changes in floral plant communities and native bee abundance patterns. More than a century after introduction into New Zealand, *B. terrestris* is now well established and has been definitively shown to compete directly with native megachilid bees in Tasmania. In Japan, *B. terrestris* competes directly with native bumble bee species and declines in *B. hypocrita* (Perez) populations are documented to coincide with increased abundance of *B. terrestris*.

There are a number of threats facing native pollinating insects, any of which may lead to the decline of these species with consequent indirect impacts on plant communities. The major threats include: competition with non-indigenous pollinators, spread of pests and diseases, new pests and diseases, habitat destruction or alteration, pesticides, invasive species, natural pest or predator population cycles, and climate change.

Non-indigenous pollinators may interact with naturalized, but non-invasive exotic plants, increasing seed set, which may lead to increased invasiveness.

## **General Requirements**

Each NAPPO member country may have different processes for approving the importation, movement and release of pollinating insects. Pollinating insects should only be approved for release after passing through a review process based on NAPPO guidelines and risk analysis, and/or based on a history of release, as appropriate. Petitions should include sufficient information to allow regulators to evaluate the risks associated with the proposed release. Petitions should be prepared for non-indigenous pollinator species as well as indigenous pollinator species that are produced in a country or ecosystem outside the area of proposed release. The NPPO in the country of release may use its discretion in determining if this petition process should be applied according to the circumstances to approve the release of the organism, issue a permit to import, determine the import and release conditions and verify compliance with the import and release conditions.

Each of the NAPPO member countries should have adequate opportunity to evaluate each petition for release of pollinating insects prior to any releases taking place. NAPPO member countries should review each petition and then provide comments to a Technical Advisory Group (TAG) that includes representatives of each of the three NAPPO member countries. The Chairperson of this group will collate the comments and based on a consensus by the reviewers, make a recommendation to the regulatory agency of the country in which the submission was made. The NPPO in the country of release should consider the comments of the TAG in evaluating whether to authorize the release. The TAG should be notified of the NPPO's decision prior to a release being authorized.

Reference specimens must be deposited in a National Collection in advance of approval for release. The specimens must be clearly labelled, indicating collection locality, latitude and longitude, date of collection, name of collector and any other pertinent information.

## **Specific Requirements**

Each petition should be preceded by a title page, a table of contents and, a summary or abstract (see Appendix 1 for template). A petition to request the release of pollinating insects in NAPPO member countries should include the following information:

### **1. Proposed Action**

- 1.1 Purpose of the release.
- 1.2 Need for the release, including the justification for introducing a non-indigenous species rather than a native pollinator.
- 1.3 Reasons for choice of this particular pollinator species from this particular country of production.
- 1.4 Specific location of rearing/containment facility and name(s) of qualified personnel operating the facility.
- 1.5 Description of the proposed release(s), including timing and frequency.

- 1.6 Location of proposed release area (including geographic coordinates and a description of the release site).
- 1.7 Methods to be used (e.g., rearing, multiplication, transportation, release).
- 1.8 Any measures to be applied to mitigate risk of unintended establishment in environment (e.g., release into screened greenhouses, queen excluders, disposal of expired hives, etc.).
- 1.9 Methods to be used for disposing of any rearing and packing material accompanying a shipment of pollinators.
- 1.10 Agencies and/or individuals that will be involved in the release and monitoring.

## **2. Target Crop(s)**

- 2.1 Taxonomy: scientific names, taxonomic authority, full classification, synonymy, common names, and sufficient characterization to allow unambiguous recognition.
- 2.2 Economic impact and benefits of the target crop(s).
- 2.3 Distribution of the target crop(s).
- 2.4 Timing of flowering in the target crop(s).
- 2.5 Availability of other pollinators, particularly indigenous pollinators, associated with the target crop(s).

## **3. Pollinator Information**

- 3.1 Taxonomy: scientific name, synonymy, common names and name of the taxonomic authority making the identification of the organism.
- 3.2 Methods used to identify the pollinator (e.g., morphological, molecular).
- 3.3 Location of reference specimens.
- 3.4 Natural geographic range, other areas where introduced, and expected attainable range in North America (also habitat preference and climatic requirements).
- 3.5 Host range of pollinator.
- 3.6 Life history and behaviour of the pollinator (including dispersal capability).
- 3.7 Source of the pollinator (laboratory/rearing facility/containment facility, original collection locality, name of collector, and name of identifier).
- 3.8 Description of how the pollinator pollinates plants.
- 3.9 History of past use of the pollinator.
- 3.10 Pathogens, parasites, and parasitoids of the pollinator and measures taken to eliminate them prior to release.
- 3.11 Standard Operating Procedure stating how the pollinator will be handled in containment.
- 3.12 Other closely related genera, sibling species, or similar species of the pollinator in North America.
- 3.13 Environmental factors that limit the distribution, reproduction or any other element of the life cycle of the pollinator.

#### **4. Region of Production Information**

- 4.1 Diseases and parasites of the pollinator in the country of production, their distribution in their native range, and their occurrence in the country of release.
- 4.2 Records of importation and environmental release of other pollinator species and their subsequent use in the country of production (species imported, when they were imported, quantities imported, country of export, where they were released).
- 4.3 List of native pollinators of the same genus or of closely-related genera in the country of production.
- 4.4 Current distribution of all con-generic pollinators in the region of production and collection (survey data, including dates of most recent survey).
- 4.5 The Standard Operation Procedures (SOPs) for the insectary in the country of production, including number of generations that the pollinator has been in production.
- 4.6 Description of the insectary.

NOTE: The NPPO may require that the insectary meets the requirements of *Guidelines for Construction and Operation of a Containment Facility for Insects and Mites used as Biological Control Agents* RSPM No. 22, or other requirements specified by the NPPO.

#### **5. Environmental and Economic Impacts of the Proposed Release**

- 5.1 Known impact on vertebrates, including humans.
- 5.2 Implications of not releasing the pollinator.
- 5.3 Direct impact of the pollinator on the target plants, non-target plants, and wild relatives
- 5.4 Distribution of the parasites and pathogens of the pollinator in the region of release, as they may occur in other organisms.
- 5.5 Parasites and pathogens known to have cross-infectivity between both the pollinator and pollinators native to the release area.
- 5.6 Indirect effects on resident pollinators (e.g., including potential competition with pollinator species that are already present in the target and non-target crop systems).
- 5.7 Indirect effects on other species (e.g., potential impacts on organisms that depend on the target crop and non-target species).
- 5.8 Possible direct and indirect effects on threatened and endangered species in North America.
- 5.9 Proposed actions to prevent undesirable environmental effects.

#### **6. Post-Release Monitoring**

The exact location and timing of release(s) must be provided to the regulatory officials. Petitioners should also provide details on the economic and environmental impacts as soon as practical after release of non-indigenous insect pollinators. Comparing predicted and observed behaviour and performance of pollinators is necessary to validate and improve regulatory systems.

Monitoring can also provide useful information for assessing future petitions.

Failure to report post-release monitoring may impact the issuance of subsequent permits to import.

In designing monitoring plans note that pre-release baseline measurements of target crops and non-target species provide for better monitoring data and documentation of effects. Also, some effects may take years or decades to manifest while others may not be long-lasting. The key elements to monitor are:

- 6.1 If establishment is not intended verification that risk mitigation measures designed to prevent establishment of the pollinator in the environment are applied consistently and effectively.
- 6.2 If establishment is intended verification of establishment and spread of the pollinator.
- 6.3 Changes in the distribution and abundance of other pollinator species in the environment over time.
- 6.4 Impacts on selected non-target species for which potential impacts are identified (e.g., threatened or endangered species, taxonomically related species and other pollinator species).
- 6.5 Changes in pollination levels (fruit and/or seed production) in the target crop and in other selected non-target plant species.
- 6.6 Changes in species diversity and community structure that are linked to the release of the organism. Monitor the displacement or exclusion of native pollinators, local extinctions, and other direct and indirect effects.

## **7. References and Acknowledgements**

Any key published and unpublished scientific records that support the information contained in the petition should be included.

## **Annex 1: Recommended Template for Petitions**

### **TITLE PAGE**

- Title (e.g., 'Petition for the Release of XXX originating from YYY for the Pollination of ZZZ')
- Name and address of Petitioner(s)
- Date
- Applicant: Name(s)
- Applicant's Organization
- Address

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- 1.2 Need for the release
- 1.3 Reasons for choice of this particular pollinator
- 1.4 Location of rearing facility and name(s) of qualified personnel
- 1.5 Description of the proposed release(s), including timing and frequency
- 1.6 Location of proposed release area
- 1.7 Methods to be used
- 1.8 Measures to mitigate unintended establishment in the environment
- 1.9 Methods to be used for disposing of any rearing and packing material
- 1.10 Agencies and/or individuals that will be involved in the release and monitoring

##### **2. Target Crop(s)**

- 2.1 Taxonomy
- 2.2 Economic impact and benefits
- 2.3 Distribution
- 2.4 Timing of flowering
- 2.5 Availability of other pollinators

##### **3. Pollinator Information**

- 3.1 Taxonomy
- 3.2 Methods used to identify the pollinator
- 3.3 Location of reference specimens
- 3.4 Geographic range

- 3.5 Host range
- 3.6 Life history and behaviour
- 3.7 Source of the pollinator
- 3.8 Description of how the pollinator pollinates plants
- 3.9 History of past use of the pollinator
- 3.10 Pathogens, parasites, and parasitoids
- 3.11 Standard Operating Procedures for handling in containment
- 3.12 Closely related genera, sibling species, or similar species in North America
- 3.13 Environmental factors limiting distribution, reproduction, etc. of pollinator

#### **4. Region of Production Information**

- 4.1 Diseases and parasites of the pollinator
- 4.2 History of importation and environmental release of other pollinator species
- 4.3 List of native pollinators of the same genus or of closely-related genera
- 4.4 Distribution of all con-generic pollinators
- 4.5 Standard Operation Procedures (SOPs) for the insectary
- 4.6 Description of the insectary

#### **5. Environmental and Economic Impacts of the Proposed Release**

- 5.1 Known impact on vertebrates
- 5.2 Implications of not releasing the pollinator
- 5.3 Direct impact of the pollinator
- 5.4 Distribution of the parasites and pathogens of the pollinator in the region
- 5.5 Parasites and pathogens known to have cross infectivity
- 5.6 Indirect effects on other pollinators
- 5.7 Indirect effects on organisms associated with target crop
- 5.8 Possible direct and indirect effects on threatened and endangered species
- 5.9 Proposed actions to prevent undesirable environmental effects

#### **6. Post-Release Monitoring**

- 6.1 Verification of the efficacy of mitigation measures intended to prevent establishment
- 6.2 Establishment and spread of the pollinator
- 6.3 Changes in the distribution and abundance of other pollinator species
- 6.4 Impacts on selected non-target species
- 6.5 Changes in pollination levels
- 6.6 Changes in species diversity and community structure

#### **7. References and Acknowledgements**