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North American Plant Protection Organization
Organización Norteamericana de Protección a las Plantas
MEXICO - USA - CANADA

NAPPO Regional Standards for Phytosanitary Measures (RSPM)

RSPM 29
Guidelines for the Petition for First Release of Non-*Apis* Pollinating Insects into NAPPO Countries

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Contents

Review

NAPPO Standards for Phytosanitary Measures are subject to periodic review and amendment. The next review for this Standard is 2019. 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 on October 20, 2008. It was revised and approved by the North American Plant Protection Organization (NAPPO) Executive Committee on August 3, 2015.

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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 dated and filed with the NAPPO Secretariat.

Distribution

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

Introduction

Scope

These guidelines are intended to assist in preparing a petition for the first 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

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.

Cameron, S.A., J.D. Lozier, J.P. Strange, J.B. Koch, N. Cordes, L.F. Solter, and T.L. Griswold. 2011. Patterns of widespread decline in North American bumble bees. Proceedings of the National Academy of Science 108: 662–667.

Colla, S.R. and S. Dumesh. 2010. The bumblebees of southern Ontario: notes on distribution and natural history. Entomological Society of Ontario 141: 38–67.

Colla, S. R. and L. Packer. 2008. Evidence for decline in eastern North American bumblebees (Hymenoptera: Apidae), with special focus on *Bombus affinis* Cresson. Biodiversity and Conservation 17(6):1379–1391.

Colla, S.R. and C.M. Ratti. 2010. Evidence for the decline of the Western Bumblebee (*Bombus occidentalis* Greene) in British Columbia. Pan-Pacific Entomologist 86: 32–34.

Colla, S.R., J. Ascher, M. Arduser, J. Cane, M. Deyrup, S. Droege, G. Hall, C. Henne, J. Gibbs, T. Griswold, J. Neff, R.P. Jean, M. Rightmyer, C. Sheffield, M. Veit, and A. Wolf. 2012. Documenting persistence and absence of eastern North American bee species (Hymenoptera: Apoidea: Anthophila) to 1990-2009. Journal of the Kansas Entomological Society 85(1): 14–22.

Colla, S.R., F. Gadallah, L. Richardson, D. Wagner, and L. Gall. 2012. Assessing declines in North American bumble bees (*Bombus* spp.) using museum specimens. Biodiversity and Conservation 21(14): 3585–3595.

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.

Cordes, N., W.-F. Huang, J.P. Strange, S.A. Cameron, T.L. Griswold, J.D. Lozier, and L.F. Solter. 2012. Interspecific geographic distribution and variation of the pathogens *Nosema bombi* and *Crithidia* species in United States bumble bee populations. Journal of Invertebrate Pathology 109: 209–216.

Dafni, A. and A. Shmida. 1996. The possible implications of the invasion of *Bombus terrestris* L. (Apidae) at Mt. Carmel, Israel. pp. 183-200, 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.

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. Pp. 99-111, In*:* Proceedings: For Nonnative Crops, Whence Pollinators of the Future? Thomas Say Publications in Entomology, Entomological Society of America.

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

Goka, K.*,* K. Okabe*,* and M. Yoneda*.* 2006*.* Worldwide migration of parasitic mites as a result of bumblebee commercialization*.* Population Ecology 48*:*285–291*.*

Grixti, J.C., L.T. Wong, S.A. Cameron, and C. Favret. 2009. Decline of bumble bees (*Bombus*) in the North American Midwest. Biological Conservation 142: 75–84.

Hingston, A.B., J. Marsden-Smedley, D.A. Driscoll, S. Corbett, J. Fenton, R. Anderson, C. Plowman, F. Mowling, M. Jenkin, K. Matsui, K. Bonham, M. Ilowski, P.B. M^{c}Quillan, B. Yaxley, T. Reid, D. Storey, L. Poole, S.A. Mallick, N. Fitzgerald, J.B. Kirizpatrick, J. Febey, A.G. Harwood, K.F. Michaels, M.J. Russell, P.G. Black, L. Emmerson, M. Visoiu, J. Morgan, S. Breen, S. Gates, M.N. Bantich and J.M. Desmarchelier. 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.

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

ISPM 5. (Updated annually). *Glossary of phytosanitary terms*. Rome, IPPC, FAO.

Kissinger, C.N., S.A. Cameron, R.W. Thorp, B. White, and L.F. Solter. 2011. Survey of bumble bee (*Bombus*) pathogens and parasites in Illinois and selected areas of northern California and southern Oregon. Journal of Invertebrate Pathology 107: 220-224.

Klein, A.-M., B. E. Vaissiere, J. H. Cane, I. Steffan-Dewenter, S. A. Cunningham, C. Kremen and T. Tscharntke, T. 2007. Importance of pollinators in changing landscapes for world crops. Proceedings of the Royal Society. 274 (1608): 303-313.

Koide, T., Y. Yamada, K. Yabe, and F. Yamashita. 2008. Methods of netting greenhouses to prevent the escape of bumblebees. Japan Journal of Applied Entomology and Zoology 52(1): 19-26.

Lozier, J.D. and S.A. Cameron. 2009. Comparative genetic analyses of historical and contemporary collections highlight contrasting demographic histories for the bumble bees *Bombus pensylvanicus* and *B. impatiens* in Illinois. Molecular Ecology 18: 1875–1886.

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

Meeus, I., M. J. F. Brown, D. C. De Graaf and G. Smagghe, (2011), Effects of Invasive Parasites on Bumble Bee Declines. Conservation Biology, 25: 662–671.

Mitchener, C.D., R.J.McGinley, and B.N. Danforth. 1994. The Bee Genera of North and Central America. Smithsonian Institution Press, Washington, D.C., U.S.A. 209p.

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.

Owen, R.E., M.C. Otterstatter, R.V. Cartar, A. Farmer, N. O'Toole, and S.R. Colla. 2012. Significant expansion of the distribution of the bumblebee *Bombus moderatus* (Hymenoptera: Apidae) in Alberta over twenty years. Canadian Journal of Zoology 90: 133–138.

Ratti, C.M. and S.R.Colla. 2010. The presence of an eastern bumblebee, *Bombus impatiens*, in western Canada. Pan-Pacific Entomologist 86: 29–31.

RSPM 5. (Updated annually). *NAPPO glossary of phytosanitary terms*. Ottawa, NAPPO.

RSPM 22. 2011. *Guidelines for construction and operation of a containment facility for insects and mites used as biological control agents*. Ottawa, NAPPO.

RSPM 40. 2014. *Principles of pest risk management for the import of commodities*. Ottawa, NAPPO.

Sachman-Ruiz, B., Narváez-Padilla, V., and Reynaud, E. 2015. Commercial *Bombus*

impatiens as reservoirs of emerging infectious diseases in central México. Biological Invasions 17: 2043-2053.

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.

Strange, J.P., J. B. Koch, V. H. Gonzalez, L. Nemelka and T. Griswold. 2011. Global invasion by *Anthidium manicatum* (Linnaeus) (Hymenoptera: Megachilidae): assessing potential distribution in North America and beyond. Biological Invasions 13: 2115–2133.

Szabo, N., S.R. Colla, D. Wagner, L. Gall, and J. Kerr. 2012. Is pathogen spillover, habitat loss or pesticide use responsible for North American wild bumblebee declines? Conservation Letters 5: 232–239.

Wehling, W.F. 2002. Risk assessment: importation of adult queens, package bees and germplasm of honey bees, *Apis mellifera* L., from Australia. http://c.ymcdn.com/sites/www.abfnet.org/resource/resmgr/imported/APHIS-2010-0001-0002.pdf

Wehling, W.F. 2002. Risk assessment: importation of adult queens, package bees and germplasm of honey bees; *Apis mellifera* L., from New Zealand. https://web01.aphis.usda.gov/oxygen_fod/fb_md_ppq.nsf/0/b46f23c2e0d370b4852568f60057a601/$FILE/0512.pdf

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

Williams, P., S. Colla, and Z. Xie. 2009. Bumblebee vulnerability: common correlates of winners and losers across three continents. Conservation Biology 23: 931–940.

Winter, K., L. Adams, R. Thorp, D. Inouye, L. Day, J. Ascher, and S. Buchmann. 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

Definitions of phytosanitary terms used in the present standard can be found in NAPPO RSPM 5 and in ISPM 5.

Outline of Requirements

This standard provides guidance on the information that should be provided in a petition for the first release of non-*Apis* pollinating insects. This standard does not include species indigenous to all three NAPPO countries. Specific guidance is provided on the reasons for the petition, pollinator information, region of production of the pollinator, and impacts (positive and negative) of the release. It also contains information on the requirement for post-release monitoring to track performance and impacts (positive and negative).

Background

Many 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 approximately one third of the world's crops require animal pollination for high, quality production (Klein et al. 2007). 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 bee species in North America (Buchmann and Nabhan 1996, National Research Council of the National Academies 2007). Declines have been most notable for bumble bee species (Colla and Packer 2008; Grixti et al. 2009; Colla and Dumesh 2010; Colla and Ratti 2010; Colla et al. 2012a, 2012b; Cameron et al. 2011). A dramatic decline in wild populations of bumble bee species in western regions of the United States occurred about the time that a disease outbreak was reported in populations of commercially raised *Bombus occidentalis* (Greene) (Hymenoptera: Apidae), 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 (Goka et al. 2001, 2006). Furthermore, pathogens such as *Nosema bombi* (Fantham and Porter) (Dissociodihaplophasida: Nosematidae) and *Crithidia bombi* (Lipa andTriggiani) (Kinetoplastida: Trypanosomatidae) have been shown to occur at higher levels in native populations around greenhouses where commercially produced bumble bees are used for pollination (Colla et. al. 2006).

Introduction and range expansion of non-native *Bombus terrestris* L. (Hymenoptera: Apidae) 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 (Dafni and Shmida 1996). 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 (Hingston and McQuillan 1999). In Japan, *B. terrestris* competes directly with native bumble bee species and declines in *Bombus hypocrita* (Perez) (Hymenoptera: Apidae) populations are documented to coincide with increased abundance of *B. terrestris* (Inoue et

al. 2008).

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, natural pest or predator population cycles, and climate change.

The following references provide additional information about bee diversity, declines in native bee populations, and cases where such population declines are likely caused by bees being introduced to a region for pollination: Buttermore (1997), Cordes et al. (2012), Meeus et al. (2011), Flanders et al. (2003), Hingston et al. (2001), Hingston and McQuillan (1998), ISPM 3: 2005, Kissinger et al. (2011), Koide et al. (2008), Lozier and Cameron (2009), Macfarlane and Gurr (1995), Mitchener et al. (1994), Owen et al. (2012), Ratti and Colla (2010), RSPM 22: 2011, RSPM 40: 2014, Sachman-Ruitz et al. (2015), Schmid-Hempel et al. (2007), Strange et al. (2011), Szabo et al. (2012), Wehling (2002a, 2002b), Wehling and Flanders (2005), Williams et al.(2009), and Winter et al. (2006).

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 pollinator species or populations non-indigenous to the NAPPO country of proposed release.

This standard provides guidelines for presenting information that may be required 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.

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, as known or available using reasonable efforts or means:

1. Proposed Action

1.1 Purpose of the release (reflects the title of the petition and provides more detail of what is expected).
1.2 Need for the release (explains why the pollinator is being proposed for release).
1.3 Reasons for choice of this pollinator species from the selected country of origin.
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 as well as factors that may affect timing of release (e.g. season, target plant, agricultural practices, weather).
1.6 Location of proposed release (e.g., province/state and region).
1.7 Methods to be used after pollinator importation (e.g., rearing, multiplication, transportation, release).
1.8 Methods to be used for disposing of any rearing and packing material accompanying a shipment of pollinators.
1.9 Agencies 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.
2.2 Economic impact 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 (order, family, genus, species, scientific authority), synonymy, and common names.
3.2 Methods used to identify the pollinator and name of the taxonomic specialist confirming the identification of the pollinator; use of both morphological and molecular methods is recommended where possible.
3.3 Location of reference specimens (national collection).
3.4 Natural geographic range, other areas where introduced, and expected attainable range in North America (also habitat preference and climatic requirements).
3.5 Diet of pollinator (e.g., pollen, nectar and oil hosts) based on published scientific literature, host data from museum specimens, and unpublished records.
3.6 Biology, reproductive potential and behaviour of the pollinator (including dispersal capability and pollination and nesting behaviour).
3.7 Environmental factors that could impact the distribution, reproduction or any other aspect (e.g. diapause) of the life cycle of the pollinator.
3.8 Source of the pollinator (original collection locality, name of collector).
3.9 History of past use of the pollinator.
3.10 Pathogens/parasites/parasitoids/hyperparasitoids (order, family, genus, species, scientific authority) of the pollinator and measures taken to detect and eliminate them prior to release.
3.11 Procedures stating how the pollinator will be handled prior to release.
3.12 Other closely related genera, sibling species, cryptic species and ecologically similar species of the pollinator in North America, when they occur.

4. Region of Production Information

4.1 Pathogens/parasites/parasitoids/hyperparasitoids (order, family, genus, species, scientific authority) of the pollinator in the country of production, their distribution in their native range, and their occurrence in the country of release based on published information.
4.2 List of and current distribution of pollinators of the same genus or of closely-related genera in the country of production.
4.3 Procedures stating how the pollinator will be handled in containment (e.g., scaling up for production of a pure culture of the pollinator) and disease management of the rearing facility in the country of production, and number of generations that the pollinator has been in production.
4.4. Description of the rearing facility.

The NPPO may require that the rearing facility meets the requirements of RSPM 22: 2011, or other requirements specified by the NPPO.

5. Environmental and Economic Impacts of the Proposed Release

5.1 Known impact on humans and other vertebrates.
5.2 Expected benefits of releasing the pollinator (e.g. benefit vs. cost – see RSPM 40: 2014 for guidelines on cost-benefit analysis of management measures).
5.3 Direct impact of the pollinator on the target plants, wild relatives and other non-target plants.
5.4 Pathogens/parasites/parasitoids/hyperparasitoids (Order, Family, Genus, species, Scientific authority) known to have cross-infectivity between both the pollinator and pollinators native to the release area.
5.5 Indirect impact of the pollinator on other species present in the same habitats (e.g., including potential competition with pollinator species that are already present in the target and non-target systems and on organisms that depend on the target crop and non-target species).
5.6 Possible direct or indirect impact on threatened and endangered species in North America.
5.7 Proposed action plan to mitigate undesirable environmental impact.

6. Post-Release Monitoring

A post-release monitoring plan should be included in the submission. 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.

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 impact. Also, some impacts 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, a method to verify that the mitigation action has been implemented consistently and effectively should be included in the submission.
6.2 If establishment is intended, verification of establishment and spread of the pollinator.
6.3 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).
6.4 Changes in pollination levels (fruit or seed production) in the target crop and in other selected non-target plant species.

Researchers and practitioners should notify the National Plant Protection Organization (NPPO) and publish details on the economic and environmental impacts of programs, as soon as practical after release of the pollinator.

7. Pre-Release Compliance

7.1 Reference specimens (10 or more) must be deposited in the National Collection of the permitting country in advance of approval for release. The specimens should be of good condition for DNA extraction and with clear labels, indicating collection locality, latitude and longitude, date of collection, name of collector and any other pertinent information.

A letter explaining that the specimens are pollinators and are being donated to the National Collection as part of the conditions under which approval to release will be granted should accompany the specimens when they are submitted. A copy of the letter should be included in the submission to the permitting NPPO.

7.2 Information on the planned location and timing of the first release(s) should be included in the submission. Note: a letter confirming the release date and location should be provided to the NPPO within 3 months after release.

8. References and Acknowledgements

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

This appendix was adopted by the NAPPO Executive Committee in August, 2015.
The appendix is for reference purposes only and is not a prescriptive part of the standard.

Appendix 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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3.10 Pathogens/parasites/parasitoids/hyperparasitoids and measures taken to detect and eliminate them prior to release
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3.12 Closely related genera, sibling species, cryptic species and ecologically similar species in North America

4. Region of Production Information

4.1 Pathogens, parasites and parasitoids of the pollinator in the country of production, their distribution in their native range, and their occurrence in the country of release

4.2 List of and current distribution of pollinators of the same genus or of closely-related genera
4.3 Procedures stating how the pollinator will be handled in containment and disease management of the rearing facility in the country of production, and number of generations that the pollinator has been in production
4.4 Description of the rearing facility

5. Environmental and Economic Impacts of the Proposed Release

5.1 Known impact on humans and other vertebrates
5.2 Expected benefits of releasing the pollinator
5.3 Direct impact of the pollinator on the target plants, wild relatives and other non-target plants
5.4 Pathogens/parasites/parasitoids/hyperparasitoids known to have cross-infectivity between both the pollinator and pollinators native to the release area
5.5 Indirect impact of the pollinator on other species present in the same habitats
5.6 Possible direct or indirect impact on threatened and endangered species
5.7 Proposed action plan to mitigate undesirable environmental impact

6. Post-Release Monitoring

6.1 If establishment is not intended, a method to verify that the mitigation action has been implemented consistently and effectively
6.2 If establishment is intended, verification of establishment and spread of the pollinator
6.3 Impacts on selected non-target species for which potential impacts are identified
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7. Pre-release Compliance

7.1 Reference specimens

7.2 Information on the planned location and timing of the first release(s)

8. References and Acknowledgements