[2] OEPP/EPPO. [OEPP/EPPO] European and Mediterranean Plant Protection Organization. 2010. Efficacy evaluation of plant protection products – Side effects on honeybees. OEPP/EPPO PP 1/170 (4), EPPO Bulletin 40, 313-319.

[3] ICPPR. [ICPPR] International Commission for Plant Pollinator Relationships. 2015. Short Overview of the ICPPR Non-Apis Workshop - Subgroup Higher Tier (Bumble bees and Solitary bees). Non-Apis Workshop. Limburgerhof, BASF Agrarzentrum, Germany, 19-20 February 2015.

[4] ICPPR. [ICPPR] International Commission for Plant Pollinator Relationships. 2016. Short Overview of the ICPPR Non-Apis Workshop - Subgroup Higher Tier (Bumble bees and Solitary bees). Non-Apis Workshop. Braunschweig, Julius-Kühn Institute (JKI), Germany, 29 February - 01 March 2016.

[5] ICPPR. [ICPPR] International Commission for Plant Pollinator Relationships. 2017. Short Overview of the ICPPR Non-Apis Workshop - Subgroup Higher Tier (Bumble bees and Solitary bees). Non-Apis Workshop. Wageningen, Netherlands, 14 February - 15 February 2017.

[6] ICPPR . [ICPPR] International Commission for Plant Pollinator Relationships. 2017. Subgroup Higher Tier (Bumble bees and Solitary bees). Non-Apis Semi-field Hands on Workshop. IBACON Rossdorf Germany 5 April 2017.

[7] Cabrera, A.R., Almanza, M.T., Cutler, G.C., Fischer, D.L., Hinarejos, S., Lewis, G., Nigro, D., Olmstead, A., Overmyer, J., Potter, D.A., Raine, N.E., Stanley-Stahr, C., Thompson, H., van der Steen, J.: Initial recommendations for higher-tier risk assessment protocols for bumble bees, *Bombus* spp. (Hymenoptera: Apidae), Integrated Environmental Assessment and Management DOI 10.1002/ieam.1675 June 2015

4.3 An international workshop on pesticide exposure assessment for non-Apis bees

Silvia Hinarejos[1], Richard Bireley[2], Jordi Bosch[3], Natalie Boyle[4], Wayne Hou[5], Theresa Pitts-Singer[6], Rajwinder Singh[7], Thomas Steeger[8], Neil Williams[9]

[1]Valent USA LLC, Dublin, CA, U.S.A.
[2]California Department of Pesticide Regulation, Sacramento, CA, U.S.A. Richard.Bireley@cdpr.ca.gov
[3]Centre for Ecological Research and Forestry Applications, Bellaterra, Spain, jordi.bosch@uab.cat
[4]United States Department of Agriculture-ARS, Logan, UT, U.S.A., Natalie.Boyle@ars.usda.gov
[5]Health Canada Pest Management Regulatory Agency, Ottawa, Canada, wayne.hou@hc-sc.gc.ca
[6]United States Department of Agriculture-ARS, Logan, UT, U.S.A., Theresa.Pitts-Singer@ars.usda.gov
[7]BASF Corporation, Research Triangle Park, NC, rajwinder.singh@basf.com
[8]United States Environmental Protection Agency, Washington, DC, U.S.A., steeger.thomas@epa.gov
[9]University of California Davis, Davis, CA, U.S.A., nmwilliams@ucdavis.edu

DOI 10.5073/jka.2018.462.042

Abstract

The honey bee (*Apis mellifera*) is typically used as a surrogate to evaluate the risk of pesticides to all bee species. However, there is uncertainty regarding the extent to which honey bees can serve as surrogates for solitary bees, bumble bees and stingless bees given differences in their life history traits (*e.g.*, body size, feeding, sociality, flight/activity season, nesting materials, behavior, overwintering strategy, *etc.*). Lack of basic knowledge of non-*Apis* bee exposure scenarios has been among the biggest challenges in determining whether honey bees are sufficient surrogates for non-*Apis* bees. As a result of a tripartite effort between regulatory agencies, academia and agrochemical industry, an international workshop was organized in Washington D.C. on 10th-12th January 2017. Forty bee researchers and risk assessors from ten different countries gathered to discuss the current state of science on pesticides exposure to non-Apis bees, and to determine how well honey bee exposure estimates used by different regulatory agencies may be protective for non-*Apis* bee species. There was a general consensus that the current honey bee exposure assessment paradigm is highly conservative. However, several data gaps were identified that hindered a complete analysis of various routes of exposure between *Apis* and non-*Apis* bees, especially when non-Apis bees may be exposed via nesting materials such as soil (*e.g.*, blue orchard bees; *Osmia* spp., alkali bees; *Nomia* spp.), leaves (*e.g.*, alfalfa leafcutting bees, *Megachile rotundata*), or a combination of soil and leaves (*e.g.*, stingless bees; tribe Meliponini). Basic conceptual models and preliminary exposure equations were discussed that could help to quantify these exposure routes, allowing for future comparisons with honey bee exposure estimates. The workshop proceedings, along with a list of critical research needs identified to quantify non-*Apis* bee exposure routes, will be published as a series of peer-reviewed journal articles.