



Update from the Pollinator Research Task Force

Presentation to the CLA/RISE Spring Regulatory Conference

April 27, 2018

Purpose of PRTF

- Coordinate and collaborate with EPA regarding generic data requirements under FIFRA related to assessing the potential risks of pesticides to pollinators
- Review existing knowledge and develop new data for submission to EPA
 - Identify and fill generic data gaps
 - Improving and validating test methods
 - Improving risk assessment procedures

PRTF Member Companies

- Arysta LifeScience North America, LLC
- BASF Corporation
- Bayer CropScience LP
- Dow AgroSciences
- DuPont Crop Protection
- FMC Corporation
- Mitsui Chemicals Agro, Inc.
- Monsanto Company
- Syngenta Crop Protection, LLC
- Valent U.S.A. Corporation

PRTF Research Projects

- Improving the honey bee (HB) larval toxicity test
- Improving estimates of HB pollen and nectar consumption
- Modeling HB colonies to predict over-wintering success
- Guttation water and other potential water exposure
- Relative toxicity of a.i. vs. formulation
- Exposure estimates for non-Apis bees
- Improving the HB toxicity of residues on foliage (RT25) test
- Crop attractiveness as a factor in risk assessment
- Solubilizing, wetting, dispersing agents for lab tests

Improving the HB Chronic Larval Toxicity Test (OECD 239)

- Historically, this test had a high failure rate
- Ring test completed on OECD 239 with modifications from Univ of Florida. Final report available on-line.

<https://drive.google.com/file/d/0B2pu9SkokN3iSWFUbmE3TU41Z1k/view>

Key findings:

- Problems with low control survival are solvable by experience and/or use of the UF modified method
- Performance of controls met quality criteria for 13 of 15 labs
- Solvent controls performed poorer than water controls; depends on solvent concentration in diet
- Tests with a reference toxicant (dimethoate) were reasonably consistent across laboratories
 - NOEC and LD₅₀ values across labs within a factor of 2

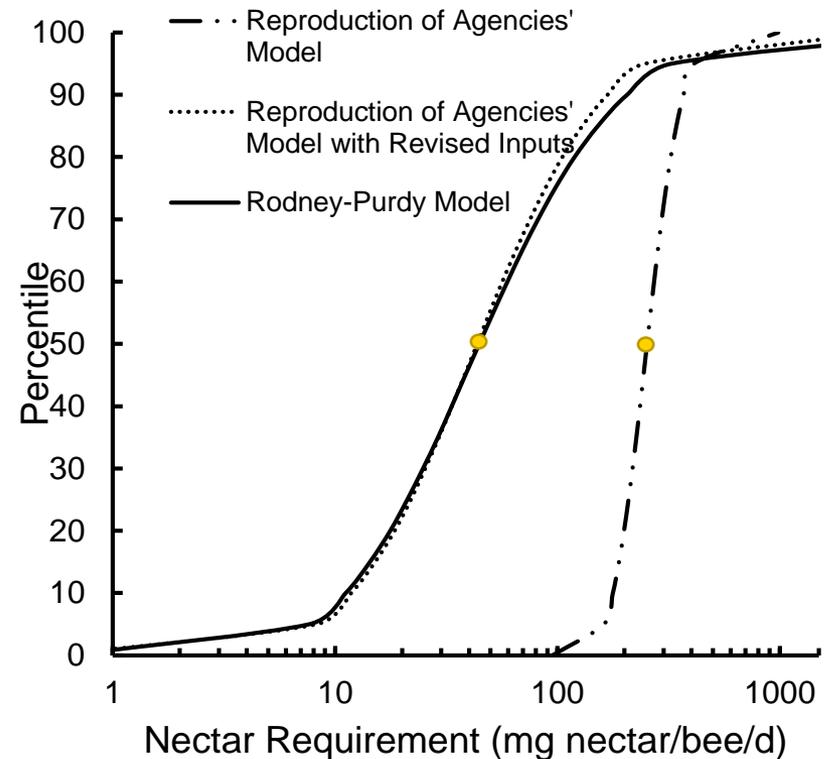
HB Pollen and Nectar Consumption

- Are BeeREX model estimates realistic?
 - 292 mg nectar per day for nectar forager bees
 - 9.6 mg pollen per day for nurse bees
- Phase 1 : literature search and synthesis of the available data on two topics:
 - Provisioning and consumption of nectar by individual **nectar foragers**, and;
 - Seasonal **colony-level food consumption**, including sugar and protein supplements.
- Report finalized in 2017. Authors: Sara Rodney (Intrinsik) and Dr. John Purdy (Abacus Consulting)

HB Pollen and Nectar Consumption

Phase 2 : Probabilistic modeling of nectar consumption by forager bees

- Reproduced EPA Monte Carlo model used to get BeeREX estimate for nectar intake
- Several model inputs not realistic
 - Number and duration of foraging trips
 - % sugar content of nectar
- With refined model inputs, median nectar intake estimate is much lower

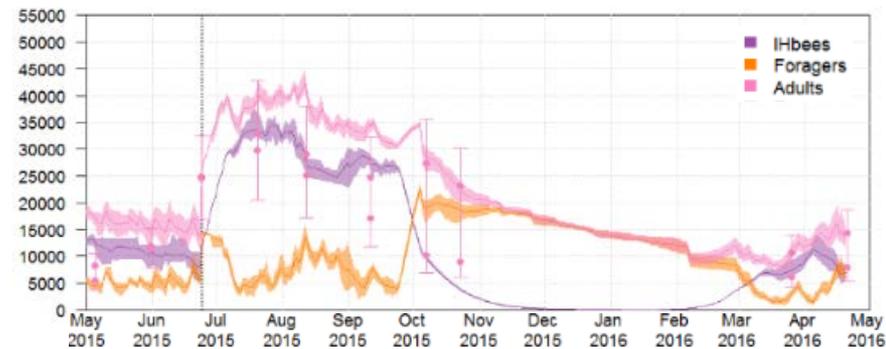


BeeREX currently greatly overestimates nectar intake by bees

Modeling HB colony viability over winter

- Control colony overwintering losses in colony feeding studies (CFS) suggest important role of stressors other than pesticides

- HB colony model (BEEHAVE) calibrated to control colonies from CFS



- Next Steps:
 - Validation of model with data from additional studies
 - Assessment of overwintering success with model by applying systematic changes to conditions experienced by colonies (landscape, weather, beekeeping, mites)

Guttation water as a potential pesticide exposure route to honey bees: A review of recent literature

- Concern raised that guttation water was an overlooked exposure pathway for systemic pesticides
- 13 relevant papers found on guttation water and other water as a source of exposure to honey bees
 - Residues may reach levels that are potentially toxic to bees
 - Residue levels vary between crops, decline as plants develop
 - Limited guttation water collection by honey bees in the field
 - No effects on honey bee colonies observed in the field
- Report finalized, publication manuscript in review

Guttation water is not an important route of exposure to bees

Relative toxicity of active ingredients vs. end-use product (EUP) formulations

- Data base search: how many pesticides have honey bee toxicity tests for both a.i. and at least one EUP?
 - 151 chemicals with acute contact LD50 values
 - 141 chemicals with acute oral toxicity LD50 values
- How often is the toxicity of the formulation different from that of the active ingredient?

Result of comparison	Contact Toxicity	Oral Toxicity
Same toxicity category	94.5%	90.3%
A.I. more toxic than formulation	4.1%	4.5%
Formulation more toxic than A.I	1.4%	5.2%

Formulations rarely differ from the TGA I in their toxicity to honey bees. TGA I data are adequate for use in risk assessment.

Exposure assessment for non-Apis bees

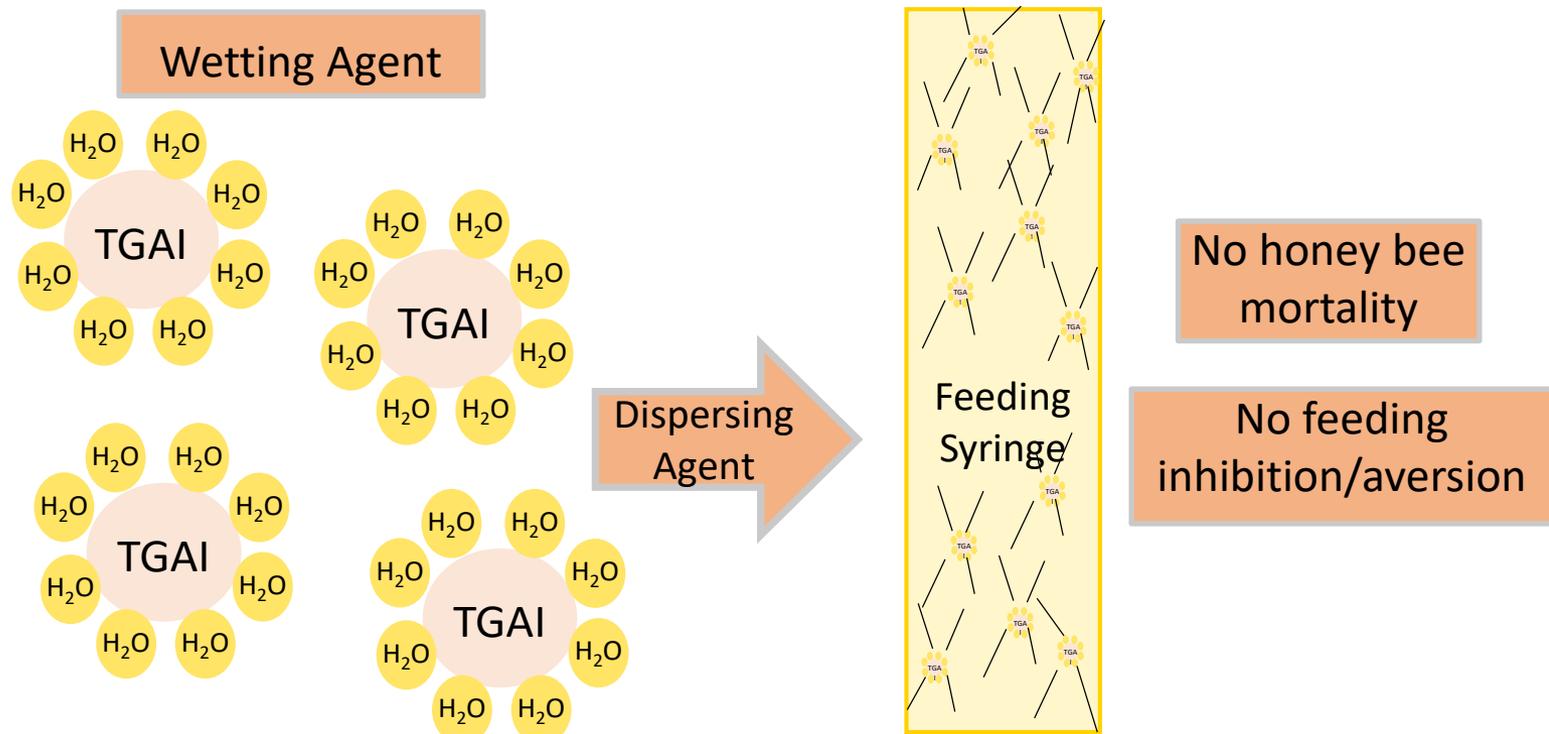
- Key topics at EPA-sponsored workshop (2017)
 - Exposure routes are different for non-Apis bees
 - Exposure levels are different for non-Apis bees
 - Data gaps and how to fill them
- Reports generated
 - Bumble bees
 - Solitary bees
 - Stingless bees
- Possible follow-up research identified by PRTF
 - Pollen and nectar consumption rates for bumble bee queens

Improving the RT_{25} Test

- EPA requested PRTF improve the RT_{25} Study Design (OCSP 850.3030)
 - RT_{25} is intended to be a measure of the time that the pesticide product remains toxic to bees in the field.
 - Considered a useful measurement by beekeepers and growers
 - Low confidence by Agency risk assessors
- PRTF, in collaboration with EPA and CROs, is working to improve standardization and reliability of test methods
 - Develop standardized test protocol
 - Ring test with CROs
- Results expected by end of 2018

Characterizing solubilizing, wetting, dispersing agents for laboratory bee studies

- Need an alternative to acetone, which can cause bee mortality



Crop attractiveness as a factor in risk assessment



- Unless a crop is considered not attractive or is harvested prior to bloom, EPA assumes bee diet is 100% from treated crop.
- What data would be needed to support use of a crop attractiveness factor?
 - PRTF met with USDA and EPA experts in October 2017
 - Feasibility of obtaining the data necessary to support use in a **quantitative** risk assessment was questioned
 - PRTF will not pursue this project at this time
- Development of population/colony models with a foraging component may be a more feasible approach to refining the assessment

Thank you for your attention

