Title: Bee Project: Assessing the Impact of Neonicotinoid Seed Treatments on Pollinators

Investigator: Gus Lorenz

Production System: Alternative

Status: Year 2

We have had all samples analyzed from 2013. Our studies indicate no transference of neonicotinoids to the reproductive part of soybeans (Fig 1). This is good news for the seed treatments. Similar results were found in cotton and corn. However, we did pick up residue in the soil (Figs. 2 and 3). Many of the neonicotinoids have a half-life of about 2 years so this is no surprise. The important thing is that it is not transferring to the flowers and causing honeybee issues. It appears we did have an issue with dust at planting and our efforts in 2012 and 2013 have indicated that on soybeans we see contamination of wildflowers about 23 and 45% of the time in 2012 and 2013. (Fig. 4 and 5). We are also sampling beans from emergence to bloom to quantify degradation of neonicotinoids in treated and untreated plots. Those results are forthcoming.

Fig. 1. Levels of neonicotinoids in soybean flowers.

Testing of Soybean Flowers at 3 sites indicated no (0) neonicotinoids, 2012

Number of flower samples	9	Number sites	3
Type	Number Positive	Mean	Range
Untreated	0	0	0
clothianidin	0	0	0
imidacloprid	0	0	0
thiamethoxam	0	0	0

Fig. 2. Neonicotinoid levels in preplant soil.

Concentration in Pre-plant Soil

Insecticide	Clothian.	Imidacl.	Thiameth.	Total
Grand Mean ± StDev (PPB)	2.69 ± 4.62	5.00 ± 5.89	2.52 ± 5.10	10.2 ± 9.20
Total Detections	31	54	44	68
Total Detections ≥ 1 PPB	30	50	43	66
% Detections ≥ 1 PPB	36	60	51	79
Maximum Level Detected	20.6	26.3	35.9	39.2
N (Samples Analyzed)	84	84	84	84

Fig. 3. Neonicotinoid levels in soil post plant.

Concentration in Soil After Planting

(Replicated IST Tests)

Insecticide	Clothian.	Imidacl.	Thiameth.	Total
% Detections ≥ 1 PPB Soy	41	39	25	63
% Detections ≥ 1 PPB Corn	34	24	34	62
% Detections ≥ 1 PPB Cotton	19	94	65	98

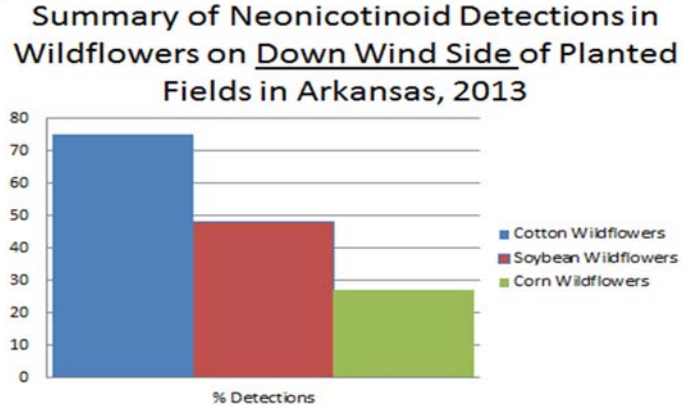
Neonics are definitely found in the soil!!
Question is: How does that impact bees?

Fig. 4. Concentration of neonicotinoids in wildflowers, 2012.

Concentration in Wild, Field-side Flowers, 2012

Insecticide	Clothian.	Imidacl.	Thiameth.	Total
Grand Mean ± StDev (PPB)	1.38 ± 7.09	1.11 ± 6.00	7.15 ± 31.9	9.64 ± 34.8
Total Detections	8	7	14	23
Total Detections ≥ 1 PPB	5	5	11	18
% Detections ≥ 1 PPB	6	6	14	23
Maximum Level Detected	52.6	47.8	256.0	257.0
N (Samples Analyzed)	78	78	78	78

Fig. 5. Concentration of neonicotinoids in wildflowers, 2013.



Based on the data we can make the following statements:

- Neonicotinoids are present during crop production from soil residue
- Movement of neonicotinoids does occur at planting and there is some contamination on wild flowers
- Soybean flowers, cotton pollen and nectar are basically free of neonicotinoids
- Therefore, concerns of seed treatments causing neonicotinoid contamination in bees is unfounded