BEYOND PESTICIDES
701 E Street, SE ■ Washington DC 20003
202-543-5450 phone ■ 202-543-4791 fax
info@beyondpesticides.org ■ www.beyondpesticides.org

December 22, 2014

OPP Docket,
Environmental Protection Agency Docket Center (EPA/DC), (28221T),
1200 Pennsylvania Ave. NW.,
Washington, DC 20460-0001.

Re: Benefits of Neonicotinoid Seed Treatments to Soybean Production.
Docket Number EPA-HQ-OPP-2014-0737

Dear Sir/Madam,

The U.S. Environmental Protection Agency's (EPA) Biological and Economic Analysis Division (BEAD) recently published a report that concluded the use of neonicotinoid seed treatments "*provide negligible overall benefits to soybean production in most situations*." Neonicotinoid insecticides are a class of pesticides that has received public, federal, and scientific scrutiny as a result of their increased association with bee decline across the U.S. These pesticides are highly toxic to honey bees and other wild pollinators, and the latest science shows that these chemicals also pose risks to other non-target aquatic and soil-dwelling organisms. It is therefore important that BEAD's analysis be considered seriously, given the widespread use of these treatments. We believe that seed treatment with negligible benefits to farmers should not continue to be used given the broad spectrum risks to the environment.

BEAD, after surveying farmer usage, yield and pest data, came to several conclusions on seed treated with the neonicotinoids, imidacloprid, thiamethoxam and clothianidin:

1. There is no difference in soybean yield when soybean seed was treated with neonicotinoids vs no insect control.
2. Seed treatments are only bioactive in soybeans within the first 3-4 weeks of planting, before typical pest pressures.
3. Seed treatment provided no additional benefit compared to foliar treatment.
4. There is no cost benefit to the farmer from using seed treatment.

This new information from BEAD supports previous studies that determined that neonicotinoid seed treatments are not efficacious and provide no benefit to the agricultural economy. Instead these substances, due to their systemic and persistent nature, pose unreasonable risks to the environment that EPA must consider when moving forward with its current registration review for this class of

chemicals. Given these latest findings and the regulatory missteps surround neonicotinoids' registration and use, EPA must take action to suspend all existing registrations of neonicotinoid seed treatment products whose costs far outweigh any perceived benefits, and whose continued use does not satisfy the terms set out in Section 3(c)(7)(A) of the *Federal Insecticide Fungicide and Rodenticide Act* (FIFRA), in that registration poses "unreasonable adverse effects on the environment."

Lack of Efficacy and Increased Pesticide Use

According to BEAD's analysis, pest pressures in soybeans tend to occur later in the growing season. Pests that attack early on the soybean growing season also persist throughout the entire season. The soybean aphid, for instance, is active late May through the end of August, while the bean leaf beetle is active mid-April to mid-September.[1] Treated seeds are only effective at controlling these and other pests during the first 3-4 weeks of the life of the plant. With planting in late spring (~April) and a typical harvest in September/November, the efficacy of the treatment occurs for just a fraction of the growing season, to control only a fraction of pests that are known to attack soybeans. Other pests, like the stink bug that prefers feeding on soybean pods that emerge later in the season, are not controlled with the seed treatment.[2] Even though these chemicals are systemic in nature, they do not provide lasting control of pests throughout the growing season, and thus have little to no impact on yield.

According to EPA's analysis, farmers often apply foliar applications of insecticides to control pests later in the growing season. Thus, it is redundant that the farmer applies neonicotinoid-treated seed to the field to control insect pests and then later sprays with a neonicotinoid or other insecticides to control the same pests. In essence, the farmer increases pesticide application to the field, as a result of a product that has failed to meet its marketed promises. This, according to the report, leads to increased economic and labor costs to the farmer.

Treated seeds are presumably marketed to protect the seed and resulting plant from pests, while reducing successive pesticide applications. Farmers pay a premium for these seeds with the expectation of fewer applications of pesticides throughout the growing season and higher yields, when compared to no pesticide application. However, neonicotinoid-treated seeds in EPA's study fail to meet this expectation and only serve to increase pesticide applications.

Cost to Farmers and Farmer Choice

Farmers have to pay a premium for treated seed and then apply insecticide post-emergent throughout the growing season. According to EPA's analysis, seed treatments did not produce higher yields than foliar treatments. So what exactly are the farmers paying for with treated seed? Over the past years, soybean seed has increased in price and when a farmer purchases seed, it is more often than not

[1] Soybean Scouting Calendar. Field Crops IPM. Purdue University Extension. Available at http://extension.entm.purdue.edu/fieldcropsipm/soybean.php.
[2] Tooker, J. 2012. Brown Marmorated Stink Bug as a Pest of Corn and Soybean Factsheet. Pennsylvania State University. http://ento.psu.edu/extension/factsheets/brown-marmorated-stink-bug-as-a-pest-of-corn-and-soybeans.

already genetically engineered and treated with various chemicals. Additionally, given that within the last two decades biotech corporations have acquired hundreds of seed companies allowing for their consolidation of seed access and distribution,[3] many farmers are left with little option than to purchase seed with some form of chemical treatment. In general, the operational costs (costs of soybean seed and chemicals) have increased by 60 percent between 2005 and 2014,[4] and seed by about seven percent between 2012 and 2013.[5] Given this trend, production costs are likely to increase with multiple applications of pesticides. Here, it is evident that real-world cost to farmers for a product that has been found to have little benefit outweighs any perceived benefit based on product claims.

Integrated Pest Management (IPM)

The prophylactic application of treated seed to fields across the U.S. flies in the face of the principles of IPM. According to EPA, IPM programs "use current, comprehensive information on the life cycles of pests and their interaction with the environment . . . and take advantage of all appropriate pest management options including, but not limited to, the judicious use of pesticides."[6] The agency outlines four steps of IPM that include: (1) setting action thresholds, (2) monitoring and identifying pests, (3) prevention and (4) control. At USDA, IPM is defined as "the implementation of diverse methods of pest controls, paired with monitoring to reduce unnecessary pesticide applications."[7]

Application of treated seed to fields does not meet the tenets of IPM set by either agency. Whereas, in IPM, pesticide application should be the last step after monitoring, prevention and after the use of other controls are exhausted, seed applications bypass these steps and lead the farmer to preemptively treat the field regardless of a pest presence or threat. Farmers then move away from applying IPM methods that prevent "unnecessary pesticide applications," and as reported in EPA's report, have to apply pesticides later in the season. Prophylactic, preemptive treatment is not IPM and undermines the goals of IPM.[8] The agency must encourage the nation's farmers to adhere to the principles of IPM that, at least on the surface, strive to uphold the "judicious use of pesticides." IPM, when utilized correctly, can not only reduce overall use of pesticides, but can also be cost-effective. According to one study, IPM methods have the highest cost-effectiveness when compared to prophylactic pesticide applications in controlling soybean pests.[9] Further, the study also reports that seed treatment has the lowest probability of recouping costs when compared to IPM methods, which was shown to also provide higher

[3] Howard, P. 2009. Visualizing Consolidation in the Global Seed Industry: 1996–2008. *Sustainability*, *1*, 1266-1287.
[4] Iowa State University Extension and Outreach. Estimated Cost of Crop Production in Iowa-2014. Ag Decision Maker File A1-20.
[5] Commodity Cost and Returns: Soybeans 2012-13. Economic Research Service. USDA.
[6] USEPA. Integrated Pest Management (IPM) Principles. Available at http://www.epa.gov/opp00001/factsheets/ipm.htm.
[7] NIFA. Integrated Pest Management. http://www.csrees.usda.gov/ProgViewOverview.cfm?prnum=20692.
[8] Szczepaniec, A. 2013. Mite have seen it coming: Neonicotinoid insecticide seed treatments and their impact on non-target organisms. Presentation at the Proceedings of the 2013 Crop Pest Management Shortcourse & Minnesota Crop Production Retailers Association Trade Show. Institute for Ag Professionals.
[9] Johnson, KD, ME O'Neal, et al. 2009. Probability of cost-effective management of soybean aphid (Hemiptera: Aphididae) in North America. *Journal of Economic Entomology,* 102(6): 2101-2108.

yield gains. Similarly, a review by biologist David Goulson also documents that pesticide use and costs were much lower in systems that utilized IPM treatment.[10]

Environmental Hazards from Continued Treated Seed Applications

The use of treated seed poses risks to bees, other non-target organisms, and contaminates various environmental compartments. For instance, one of the greatest sources of exposure for bees is from the exhaust of the tractor-drawn planters that spew small residues (dust) of treated seeds into the air while sowing. An Italian study finds that bee mortality increased right after seed sowing and confirmed these findings with postmortem chemical analysis that found high concentrations of neonicotinoid insecticides (imidacloprid and clothianidin) as high as 500 ng/bee of active ingredient.[11] A similar study involving the seed sower finds comparable results of increased bee mortality on the day of sowing and decreased foraging days after sowing, this time with thiamethoxam.[12] Similarly, a study by Krupke et al. found extremely high levels of clothianidin and thiamethoxam in planter exhaust material produced during the planting of treated corn seed.[13] These chemicals are also persistent in soil. Clothianidin residues, for example, remain present in the surface soil of agricultural fields long after treated seed had been planted, as long as two growing seasons.[14] A recent study from the British Food and Environment Research Agency, documents levels of clothianidin, thiamethoxam and imidacloprid that persisted in soil at least three years after treated seed was applied.[15]

Additionally, the U.S. Geological Survey has detected neonicotinoids levels in waterways across the Midwest,[16] where neonicotinoid-treated corn and soybean is widespread, indicating that these systemic pesticides are making their way into all environmental compartments. Further, a recent review by Morrissey et al., which builds on previous work, finds that neonicotinoid concentrations detected in aquatic environments pose risks to aquatic invertebrates and the ecosystems they support.[17,18]

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[10] Goulson, D. 2013. An overview of the environmental risks posed by neonicotinoid insecticides. *Journal of Applied Ecology*. 50: 977-987.
[11] Girolami, V. et al. 2011. Fatal powdering of bees in flight with particulates of neonicotinoids seed coating and humidity implication. *J. Appl. Entomol*. 136:17–26.
[12] Tremolada P, et al. 2010. Field trial for evaluating the effects on honeybees of corn sown using Cruiser and Celest xl treated seeds. *Bull Environ Contam Toxicol*.85(3):229-34.
[13] Krupke CH, Hunt GJ, Eitzer BD, Andino G, Given K. 2012. Multiple Routes of Pesticide Exposure for Honey Bees Living Near Agricultural Fields. *PLoS ONE* 7(1): e29268. doi:10.1371/journal.pone.0029268.
[14] Ref 13.
[15] Jones, A, Harrington, P and Turnbull, G. 2014. Neonicotinoid concentrations in arable soils after seed treatment applications in preceding years. Pest Management Sci. 70(12): 1769–1936.
[16] Hladik, M, Kolpin, D and Kuivila, K. 2014. Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA. Environmental Pollution. 193:189-196.
[17] Morrissey, C. et al. 2015. Neonicotinoid contamination of global surface waters and associated risk to aquatic invertebrates: A review. *Environment International*. doi:10.1016/j.envint.2014.10.024.
[18] Goulson, D. 2013. REVIEW: An overview of the environmental risks posed by neonicotinoid insecticides. *Journal of Applied Ecology.* 50: 977–987. doi: 10.1111/1365-2664.12111.

These environmental hazards show that the costs far outweigh any perceived benefits these treatments may have for farmers or the economy.

Safer, Viable Alternatives Available

While the agency has focused on foliar chemical alternatives to seed treatment, these do not go far enough to protect the environment or pollinators from harmful pesticides. Instead of considering other pesticide chemistries and application methods, the agency can look to organic crop production, which offers model practices that can provide opportunities for reducing pesticide use and exposure in agriculture. We encourage EPA to look to organic production systems and tools as a readily available crop production framework that does not rely on seed treatment applications to control pests. In organic systems, measures to control pests are undertaken through physical, mechanical, cultural, or biological means, and pesticides are allowed for use only when it can be proven that these methods have failed. Further, steps must be taken to protect and preserve existing organic agricultural operations from pesticide contamination, including drifting contaminated dust from treated seed application, and seek ways to uphold traditional IPM principles to reduce pesticide applications and protect the environment.

EPA Must Conduct Additional Efficacy Studies, Revoke Treated Article Exemptions for Seeds Treated with Neonicotinoids, and Suspend Neonicotinoid Registrations.

Evaluation of efficacy data was an important component of the pesticide registration requirements established under FIFRA.[19] Because of EPA concern that efficacy data reviews were too costly and detracting from the health and environmental risk assessments, FIFRA was amended to grant the agency some discretion in determining whether to waive efficacy requirements for registration in certain circumstances.[20] With this discretion, however, the important component of pesticide efficacy evaluation has fallen by the wayside and is routinely excluded in registration applications through what is now EPA's general waiver of efficacy review.[21] In the instance of neonicotinoids, the lack of efficacy data review has been made worse by the fact that once applied to the seed, neonicotinoids are exempt from most of FIFRA's requirements, including labeling.[22]

As discussed throughout these comments, the result of these regulatory gaps has resulted not only in significant and unreasonable adverse effects on the environment, but also unwarranted economic burdens on farmers and faulty product claims. To avoid additional regulatory conflicts, EPA should conduct additional efficacy reviews and, in the meantime, suspend neonicotinoid registrations and revoke any exemptions for seeds treated with neonicotinoids.

Conclusion

[19] See Bates v. Dow Agrosciences LLC, 544 U.S. 431 (2005).
[20] See *id.* and 7 U.S.C. § 136a(c)(5).
[21] 40 C.F.R. § 158.400.
[22] 40 C.F.R. § 152.25.

BEAD's report confirms previous findings that neonicotinoid seed treatments fail to provide farmers with any economical or yield benefits in most areas of the U.S. As a result, we encourage the agency to reevaluate this pesticide use pattern and restrict the use of seed treatment products. Farmers have an important job to do and they have been given false promises that have now been proven to be simply illusory. Seed treatment is costly and does not serve to effectively control pest pressures or increase yield. Seed treatment also persuades farmers to move away from IPM practices that actually protect crop yields and reduce overall pesticide exposures. In the interest of the nation's farmers and the environment on which they rely, EPA must move forward with suspending neonicotinoid registrations and revoke any exemptions for seeds treated with neonicotinoids, as they do not meet the no unreasonable adverse effect under FIFRA.

Respectfully,

Nichelle Harriott
Staff Scientist