



October 24, 2019

Environmental Protection Agency  
Office of Pesticide Programs (OPP) Docket  
EPA Docket Center (28221T)  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460-0001

**RE: Docket ID: EPA-HQ-OPP-2017-0433; "Interim Process for Evaluating Potential Synergistic Effects of Pesticides during the Registration Process"**

The Weed Science Society of America, along with the Aquatic Plant Management Society, North Central Weed Science Society, Northeastern Weed Science Society, Southern Weed Science Society and Western Society of Weed Science represent over 3000 weed scientists from around the world. Members include academic, governmental, and private industry research scientists, university extension professionals, educators, graduate students, and federal, state, county, and private land managers. We welcome the opportunity to comment on the Process for Evaluating Pesticide Synergistic Effects. We applaud the Environmental Protection Agency (EPA) for its efforts and time on the current interim process and for allowing public comments to improve the process.

**Weed Science Societies' Statement on Synergism**

Pesticide mixtures, both in tank mixes and pre-mixes, have many important benefits: reduced chemical applications, leading to reduced time, labor, and soil compaction; more consistent and extended control over a range of pests; chemical dose reduction, improving crop safety and reducing pesticide residual effects; and resistance management. There are many environmental and application factors that influence how pesticides will interact with each other, including the chemical properties, species of interest, timing of application and stage of plant growth, and environmental conditions (Green 1989). Most often in herbicide mixtures, the active ingredients act independently of one another and respond predictably with additive effects. Some mixtures, i.e. many mixtures containing glyphosate, have an

antagonistic response, reducing overall weed control (Hatzios and Penner 1985). Rarely, herbicide mixtures create synergistic effects, increasing activity and control (Cedergreen et al. 2007).

The biggest challenge currently facing weed managers is the continual evolution of herbicide resistance. Pre-mixes and tank mixes that contain multiple mechanisms of action are crucial for combating resistant weeds and reducing selection pressure (Beckie 2009; Evans et al. 2016). The societies want to ensure pesticide mixtures remain easily accessible and affordable to effectively control pests, reduce selection pressure, and reduce the costs associated with multiple chemical applications.

### **Comments on the Interim Process**

The National and Regional Weed Science Societies believe the current interim process follows the guidelines proposed in the National Research Council (NRC) report on “Assessing Risks to Endangered and Threatened Species from Pesticides” (McDowell et al. 2013). We agree that this interim process fits with the NRC decision to only study synergistic interactions if there is scientific evidence that warrants additional research. Registrants are likely to study and report their recommended pesticide mixtures in a patent. While additional tank mixes are likely to occur in practice, the process to study all possible combinations would be too laborious and would go against pg. 109 of the NRC decision: “The toxicity of a chemical mixture probably will not be known, and it is not feasible to measure the toxicity of all pesticide formulations, tank mixtures, and environmental mixtures.” Synergism is already so rare, especially if combining multiple mechanisms of action (Zhang et al 1995), that additional testing is unreasonable. From page 104 of the NRC document, “the committee, however, emphasizes that the complexity of assessing the risk posed by chemical mixtures should not paralyze the process.” Additional research into all possible mixtures and effects could hinder the process, increasing the cost of pesticide registration and chemical costs to farmers and landowners.

To date, EPA has used the interim process to evaluate 24 new active ingredient registrations. None of these reviews have ultimately impacted an existing EPA ecological risk assessment. The results from the analysis of the first 24 active ingredients reflects that there is a low probability that claims asserting greater than additive (GTA) effects will impact ecological risk assessments for pesticide active ingredients. Therefore, the National and Regional Weed Science Societies support EPA’s plans to evaluate the results of the interim process, and once a sufficient number of reviews are completed, to decide whether continuing the process has utility in evaluating ecological risk associated with product use. If the outcome of EPA’s future evaluation demonstrates that the interim process does not have utility in evaluating ecological risk associated with product use, our societies agree that EPA and registrants should not exhaust additional time and resources in this endeavor and suspend evaluations.

### **Conclusion**

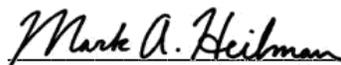
The National and Regional Weed Science Societies appreciate the opportunity to provide comments on the EPA’s “Interim Process for Evaluating Potential Synergistic Effects of Pesticides during the Registration Process.” We commend the Agency on the transparency of the current process. The National and Regional Weed Science Societies fundamentally support continuing the interim proposed process for evaluating potential synergistic effects of herbicides. If the outcome of EPA’s future evaluation demonstrates that the interim patent review process does not have utility in evaluating

ecological risk associated with product use, our societies agree that EPA and registrants should not exhaust additional time and resources in this endeavor and suspend evaluations.

Sincerely,



Larry Steckel  
President  
Weed Science Society of America



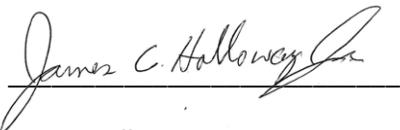
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#### Cited References

Beckie, HJ and Reboud, X. 2009. Selecting for weed resistance: Herbicide rotation and mixture. *Weed Tech.* 23:363-370. doi: <http://dx.doi.org/10.1614/WT-09-008.1>

Cedergreen N. 2014. Quantifying synergy: A systematic review of mixture toxicity studies within environmental toxicology. *PLoS ONE* 9(5): e96580. doi:10.1371/journal.pone.0096580

Evans, J. A., Tranel, P. J., Hager, A. G., Schutte, B., Wu, C., Chatham, L. A., & Davis, A. 2016. Managing the evolution of herbicide resistance. *Pest Manag Sci* 72(1), 74-80. <https://doi.org/10.1002/ps.4009>

Green JM. 1989. Herbicide antagonism at the whole plant level. *Weed Technol* 3:217-226

Hatzios KK, Penner D. 1985. Interactions of herbicides with other agrochemicals in higher plants. *Rev Weed Sci* 1:1-63

McDowell, JE, Akcakaya HR, Angelo MJ, Durkin P, Fairbrother A, Fleishman E, Goodman D, Graf WL, Gschwend PM, Hope BK, Leblanc GA, Quinn TP, and Reed NR. 2013. National Research Council. *Assessing Risks to Endangered and Threatened Species from Pesticides. Chapter 4: Effects.* Washington, DC: The National Academies Press, 2013. doi:10.17226/18344.

U.S EPA. 2019. *Process for Receiving and Evaluation Data Supporting Assertion of Greater than Additive (GTA) Effects in Mixtures of Pesticide Active Ingredients and Associated Guidance for Registrants.*

Zhang J, Hamill AS, Weaver SE. 1995. Antagonism and synergism between herbicides: Trends from previous studies. *Weed Technol* 9:86-90