July 10, 2019

Academic colleagues,

Below are a few new updates. Please send me feedback this season so I can make these updates as useful as possible. Thanks.

- **Managing Volatility Potential:** We continue to receive questions regarding the impact of tank mixing with glyphosate-based products and pH on the volatility potential of XtendiMax® with VaporGrip® Technology. We've conducted extensive research into these areas and understand that others are currently researching it as well. We'd like the opportunity to sit down with those interested and discuss their research as well as share more regarding our findings. For those conducting trials, please let me know if you'd like to have such a discussion.

  As conversations continue, I wanted to provide an overview of our findings on these topics and share links to information with additional details.

  In our research, we found that VaporGrip® Technology helps control volatility by managing the equilibrium in the spray tank between dicamba in its salt form – the anionic (negatively charged), non-volatile form of dicamba – and dicamba acid – the volatile form of dicamba. VaporGrip Technology works by removing protons from the system, which in turn keeps dicamba in its salt form. Through basic chemistry principles, this limits the amount of dicamba molecule that is available to volatilize once sprayed.

  Bayer implemented a proactive process through which tank mix products are tested for volatility potential. This process ensures that these products do not adversely affect the volatility potential of XtendiMax with VaporGrip Technology. Additionally, as part of our 2018 field testing, we utilized the common tank mix of XtendiMax + Roundup PowerMAX® + Intact™ (DRA) to evaluate volatility potential under varying conditions in six states. This tank mix of XtendiMax + Roundup PowerMAX + Intact was extensively evaluated by the EPA in its most recent assessment of XtendiMax with VaporGrip Technology prior to re-registering the herbicide in Nov. 2018. EPA's assessment also considered extensive field trial research conducted by several academic partners during the 2018 growing season. These academic trials were conducted using the tank mix of XtendiMax + Roundup PowerMAX + Intact.

  Our research, along with the independent research of academic partners, continues to show that tank mixing potassium salt (K-salt) formulations of glyphosate, such as Roundup PowerMAX (in accordance with those tank mix partners listed at XtendiMaxApplicationRequirements.com), **does not increase volatility potential** in a way that would impact plants outside of the field. Consistent trial results show that the addition of approved Roundup® brand agricultural herbicide tank mix products results in pH shift by 0.2 to 0.3 units, with expected pH in the range of 4.8-4.9 of the spray solution.

  IPA salt glyphosates, on the other hand, can impact volatility and potentially contribute to off-target movement, and as a result, are prohibited from being used as a tank mix partner. Early during our product formulation testing we determined that IPA-salt of glyphosate did not meet our established baseline for acceptable tank mix products, and therefore is not an approved tank mix partner.

  The following resources provide additional insights into our research and findings related to glyphosate tank mixes and pH.
  - Understanding Spray Solution pH with XtendiMax® with VaporGrip® Technology

  - XtendiMax with VaporGrip Technology Large Scale Drift and Volatility Trials
  - The Chemistry Behind Low-Volatility Dicamba
  - The Other Dicamba Story: Chemistry innovations that reduce the volatility potential of an extremely effective herbicide

- **2019 Field Trials:** Across many states and in conjunction with corresponding universities, we are continuing current and future dicamba formulation evaluations utilizing the modified Low-Tunnel trials initially developed at Mississippi State University. We are also conducting large-scale drift and volatility field trials with a number of academic partners. For example, in partnership with Auburn University, we have completed a large-scale volatility and drift trial measuring flux and drift of a potential future dicamba formulation over dicamba-tolerant cotton. In my next bulletin, I will provide a more comprehensive list of other trials and collaborations underway.

  Our Bayer-led Good Laboratory Practice (GLP) large-scale drift and volatility field trials also kicked off with a trial in Mississippi. We applied XtendiMax with VaporGrip Technology + Roundup PowerMAX® + an approved DRA over Roundup Ready 2 Xtend® soybeans. We'll be evaluating the results of that trial in the coming weeks. As with our other GLP field trials this season, we'll submit that data to the Environmental Protection Agency (EPA).

- **Dicamba Inquiries:** As of June 25, we have received 9 off-target movement inquiries, 2 crop response inquiries, and 67 weed performance inquiries. We are conducting field visits and, in some instances, have found that growers applied XtendiMax with VaporGrip Technology over a non-dicamba tolerant field. This reinforces the importance of keeping detailed records and following the XtendiMax with VaporGrip Technology label, including only applying approved dicamba herbicides over dicamba-tolerant soybeans and cotton. We continue to provide our customers with these reminders as well as weed management recommendations that take into consideration the late season.

  As you're speaking with growers, applicators or others in your regions, please remind them that they can contact us at 1-844-RRXTEND with questions or inquiries. We'll keep you informed of our inquiries as the season progresses.

As always, please don't hesitate to reach out to me with questions, concerns or comments.

Thanks,
Ty

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