

Draft Internal Deliberative, Do Not Quote or Cite

Update on Dicamba Evaluation

As of Wednesday, October 3rd, EFED's position on enlarging the action area for evaluation of endangered species was to incorporate an omni-directional, 60-m "buffer" around the soybean and cotton crop data layers and determine where the enlarged action area overlapped with the species range/critical habitat at 1% or greater. The 60-m "buffer" was based on a weight-of-evidence evaluation of available data for visual injury versus yield at the reproductive stage, which indicated that at 10% visual injury, a 5% reduction in yield would be expected.

The 60-m "buffer" was presented as preliminary and contingent on the results of further evaluation of the 2018 Norsworthy Proctor Arkansas field study. Early evaluation of the visual signs of injury curves for transects in Norsworthy were evaluated against a registrant-suggested 20% visual signs of injury threshold to approximate the threshold for effects on height and yield. Subsequent EFED evaluation of all available visual signs of injury measurements compared with height and yield effects measurements indicated a reasonable and protective threshold for visual signs would be 10%. The Norsworthy study when evaluated with a 10% visual signs of injury threshold suggested that a larger buffer (135 m) would be appropriate. However, some potentially confounding issues regarding this study were presented by the registrant as suggestive that the study was not reliable.

On Thursday, Oct 4th, EPA members of EFED and RD participated in a conference call with Dr. Norsworthy regarding the 2018 study to get clarification on the potentially confounding issues:

- **Issue One: Acetochlor tank mix and potential to adversely affect soybeans during the trials**

With regards to the effects of the use of Warrant, Dr. Norsworthy indicated it was the registrant and grower, not Dr. Norsworthy, who prepared the tank mix to include Warrant and that after the delay Dr. Norsworthy suggested that a new tank mixture be prepared, but that the registrant and grower recommended using the prepared tank mix. With regards to damage resulting from acetochlor, Dr. Norsworthy indicated that Warrant can be used as post-emergent application on soybeans and that there was no acetochlor damage to the Xtend soybeans, planted on the treated field, or the Roundup Ready soybeans, planted surrounding the treated field. Additionally, Dr. Norsworthy indicated that the damage resulting from acetochlor exposure is fundamentally different from that produced by dicamba and that the majority of weed scientists can differentiate between these types of damage. While dicamba damage results in a cupping of the leaves, acetochlor damage results in a crinkling of the leaf and a wavy appearance.

- **Issue Two: Acetochlor tank mixture could alter the volatile potential of dicamba in the study, negating Xtendimax with Vapor Grip performance**

Dr. Norsworthy has investigated the effect of tank mixture partners and tank holding time as it relates to tank content pH. This was done to address any concern that conditions of the tank mixture could have altered the pH of the spray tank contents such that the buffering capacity of Xtendimax would be nullified and promote low pH shift, inducing enhanced dicamba volatility. Preliminary data show no effect on tank pH with the tank mix partners, including microencapsulated acetochlor (Warrant), with and without tank mix holding time

Draft Internal Deliberative, Do Not Quote or Cite

ER 0523

ED_002219A_00000957-00001

Draft Internal Deliberative, Do Not Quote or Cite

Dr. Norsworthy indicated that he has also conducted trials under hoop tunnels investigating volatility of Xtendimax with (1) Roundup Powermax and Warrant and (2) Roundup Powermax and Warrant that had been sitting in a tank for 4 days (approximating the tank holding time encountered in the field study). Preliminary data indicates that there was no increase in volatility based on tank holding time.

Dr. Norsworthy has committed to sharing these data with EPA.

Issue Three: Plant damage scoring is alleged to be atypical compared to other field studies

Dr. Norsworthy referred EFED to the two types of visual signs of injury methods used to score observations of injury during the field study. Both methods were employed side by side during the evaluation of transect. Both methods are in close agreement with respect to visual damage extent at each point along the transects.

Issue Four: Tarped plants were insufficient to prevent spray drift damage, thereby overestimating the role of vapor drift in the study

Dr. Norsworthy emphasized that the use of the tarps was at the behest of the registrant sponsor and are not inconsistent with the method used in other field studies.

Issue Five: The use of bucketed plants along transects to segregate damage from primary drift from secondary vapor drift was inappropriate due to the potential for cross contamination with adjacent un-bucketed plants.

Dr. Norsworthy indicated that plants within 6 inches of the outside of the buckets were removed in order to prevent cross contamination of the bucketed plants from plants impacted by primary and secondary drift.

Issue Six: The use of bucketed plants along transects to segregate damage from primary drift from secondary vapor drift unduly stressed the plants and resulted in questionable results attributed to vapor exposure.

Dr. Norsworthy indicated that buckets were in-place only for the duration of spray and for up to 30 minutes post application. He did state that visible plant stress occurred as a result of covering the plants with tarps and buckets. However, the plant damage from tarp/bucket effects was easily distinguishable from the damage resulting from dicamba exposure and the damage from tarps/buckets was no longer apparent 14 days after treatment. His presentation of visual signs of damage for bucketed plants was based on the extent of visual signs of damage consistent to the scoring of the types of damage attributable to dicamba exposure. Dr. Norsworthy also reiterated the similarity of the extent of damage with distance between bucketed and non-bucketed plants, suggesting a common level of exposure.

Draft Internal Deliberative, Do Not Quote or Cite

Draft Internal Deliberative, Do Not Quote or Cite

Issue 7: Irrigation confounds the transect data because the irrigation water can be transporting herbicide to the off-treatment field soybeans.

Dr. Norsworthy confirmed for EFED that no irrigation water originating from the treatment area was transported to the transect areas for the west, east and south transects of the field study. The only transect receiving irrigation water originating from the treated field was to the north. (Note for this reason, EFED has confined its evaluation of the field study to the west, east and south transects.) Dr. Norsworthy also indicated that data from another site, where irrigation was not performed, but a significant rainfall event occurred within three days of application, produced similar off-field plant effects as seen in the north transect of Proctor, Arkansas field study.

- **Future availability of yield data**

EPA asked if yield data would be available soon for use in the analysis. Dr. Norsworthy indicated that the fields would not be harvested until the 3rd or 4th week of October.

- **Potential hypotheses to explain differences in the Arkansas data and other field trials from other areas**

EPA inquired of Dr. Norsworthy his thoughts as to why the results from his trials were different than those observed in other areas of the country. Dr. Norsworthy indicated that he wasn't sure. Dr. Norsworthy indicated there could be issues relating to the proximity of the region to Crowley's Ridge and the frequency of inversions in the area, and that soil pHs were low in region relative to other areas of the country. In the end, Dr. Norsworthy indicated that there were a lot of complicating factors and that temperature, while it plays a major role in volatilization, was not the only factor.

Referring back to the discussion of irrigation, Dr. Norsworthy also discussed the potential for irrigation to play a role. He opined that Midwest soils may have sufficient moisture and fertility characteristics as opposed to the South-central soils which are thinner in depth of topsoil and often require irrigation to maintain adequate soil moisture. He also opined that the presence of irrigation has the potential to enhance visual damage extent as the plants are actively growing, but may also limit the extent of damage to yield because the plants have resources to affect recovery from damage.

EFED conclusions:

Based on this discussion, EFED cannot preclude the use of the Norsworthy data in the expansion of the dicamba action area. Acceptance of the Norsworthy data as valid results in the recommendation of a 135-m "buffer" around the soybean and cotton crop data layers for the purposes of establishing a protective and technically defensible limit to the action area for the proposed regulatory action.

Draft Internal Deliberative, Do Not Quote or Cite

ER 0525

ED_002219A_00000957-00003