

Dicamba Symptomology Community Science Monitoring Report

September 10, 2021

Dan Scheiman, Ph.D.
Plants for Birds Program Manager
Audubon Delta

Introduction

Audubon believes that working lands can and should work for birds and people. However, the increasing use of dicamba on Arkansas cropland is putting birds at risk in our agricultural landscape. Research conducted by the University of Arkansas shows that the current dicamba formulations are volatile—the product can move off target in all directions, damaging 1.5-times more acres than are treated. Further, the science shows that high temperatures, humidity levels, and temperature inversions dramatically increase volatility and thus exacerbate the collateral damage. Audubon predicted that in a landscape full of GMO crops, the atmospheric loading of volatile dicamba could be enough to cause landscape scale damage to our state natural areas, wildlife management areas, national wildlife refuges, family farms, and the wildlife they harbor.

To test this prediction and gain a better understanding of the geographic extent of the threat, Audubon Arkansas (now Audubon Delta) led a community science monitoring project in 2019 and 2020. Volunteers searched for signs of dicamba symptoms on native and ornamental plants across eastern Arkansas. The data supported our prediction that dicamba's impact to off-target plants is widespread in both geographic scope and number of species afflicted.

In 2021, the Arkansas State Plant Board permitted dicamba to be sprayed through June 30. Audubon set out to document ongoing symptomology at sites impacted in previous years.

Methods

Audubon and trained volunteers looked for symptoms associated with a plant growth regulator (PGR) herbicide, including leaf cupping, epinasty, and chlorosis. Sightings were submitted through a customized version of the free ArcGIS Collector app. Data fields included: observer name (optional), observation date, location name, species (if known), and comments (optional). One or more photos of the vegetation were also submitted through the app. The app automatically recorded coordinates with each submission. Monitoring was conducted largely in August. An expert on dicamba symptomology from outside Arkansas reviewed photos and rated them as probably, possibly, or unlikely showing symptoms consistent with a PGR herbicide.

Results

Audubon staff and trained volunteers collectively visited 21 sites and took 176 photos documenting possible or probable PGR herbicide symptoms (Table 1). These sites were spread across nine counties – Clay, Crittenden, Cross, Jackson, Lee, Lonoke, Mississippi, Phillips, and Poinsett – demonstrating the geographic spread of off-target impacts (Fig. 1). Species displaying probable or possible symptoms included catalpa, elms, ginkgo, magnolias, maples, mulberries, oaks, persimmon, pokeweed, poison ivy, ragweed, redbud, sugarberry, sunflower, sycamore, trumpetvine, tuliptree, and Virginia creeper (Figs. 2-

5). Most of these plants are listed in National Audubon Society's Plants for Birds database (audubon.org/native-plants) as providing food birds, including insects that most landbird species need to feed their young.

Symptoms were documented on a variety of public lands including university research farms, cemeteries, churchyards, a national wildlife refuge, Arkansas Game & Fish Commission properties, state natural areas and the Helena Welcome Center.

Discussion

These data continue to support Audubon's claim that using dicamba during warm weather can have landscape scale off-target impacts. Further, we photographed trees that showed signs of disease and dieback, as well as cupping (Figs. 6-8). We are concerned that repeated exposure to herbicide drift is weakening trees, making them more susceptible to other sources of damage and death. If tree diversity declines in eastern Arkansas, so too will bird diversity.

Figure 1. Locations of all observations made by Audubon staff and volunteers in 2021 where at least one photo was taken showing symptoms possibly or probably consistent with a PGR herbicide. Only select sites where symptoms were observed in previous years were visited.

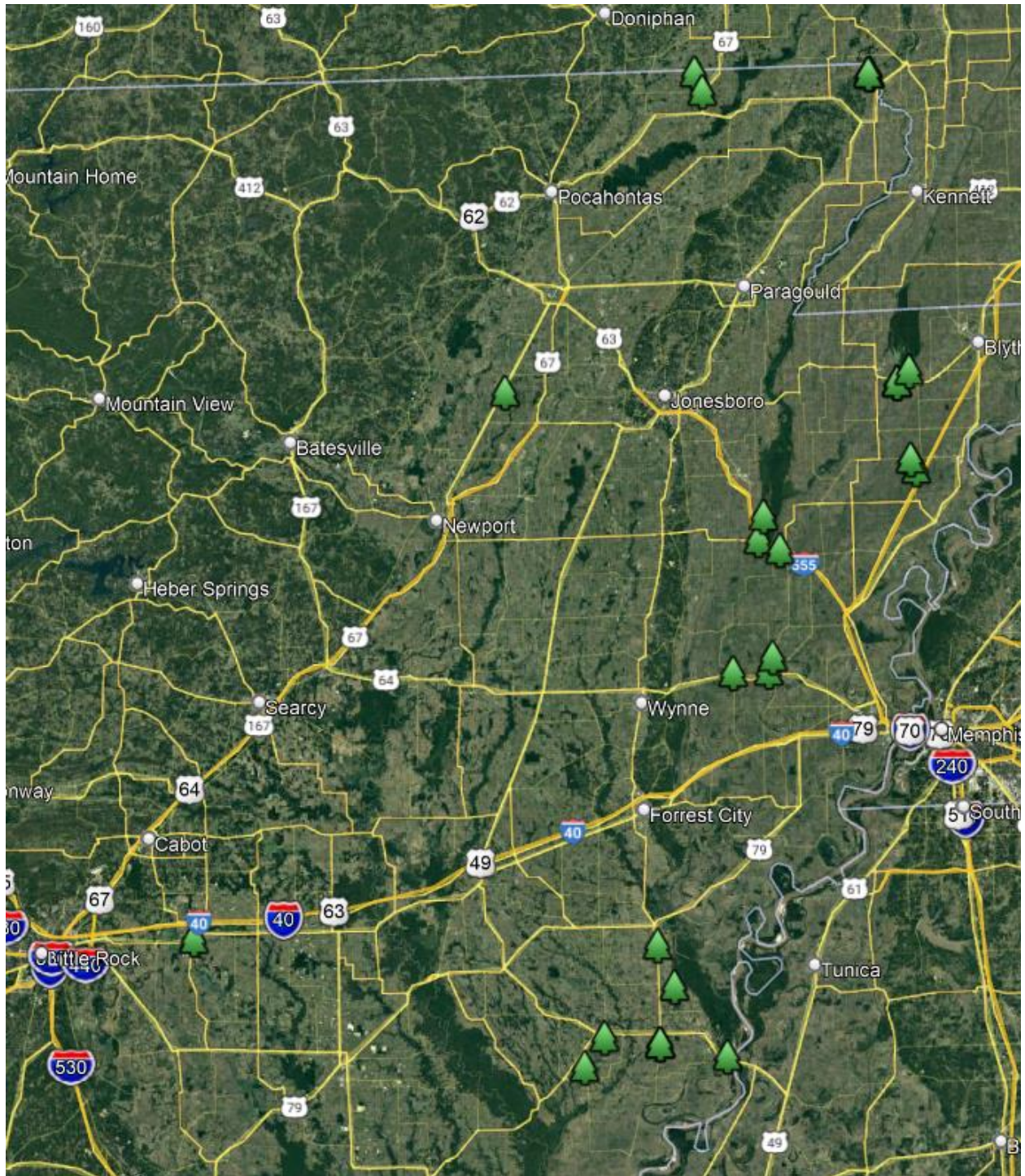


Figure 2. An oak showing severe PGR herbicide symptoms at the Lick Creek access to Delta Heritage Trail State Park, Phillips Co. This site showed symptoms on multiple species in 2019 and 2020 as well. How many years can a tree withstand exposure before dying?



Figure 3. The same Callery pear at Marked Tree Cemetery, Poinsett Co., photographed in 2019 and 2020 continues to show PGR herbicide symptoms in 2021. Multiple tree species showed uniform symptomology.



Figure 4. PGR herbicide symptoms on an oak in the interior of Chalk Bluff Natural Area, Clay Co. All the oaks throughout this 55-acre preserve showed symptoms from top to bottom.



Figure 5. A magnolia at Lon Mann Cotton Research Station, Lee Co., showing PGR herbicide symptoms. In addition, all five tuliptrees in the parking lot showed extensive cupping, as they did in 2020.



Figure 6. An oak at Joe Hogan State Fish Hatchery, Lonoke Co., showing not only cupping but other signs of disease.



Figure 7. All the sugarberries at Parkin Archeological State Park, Cross Co., showed signs of disease in addition to leaf cupping. Some trees had entire sections showing necrosis.



Figure 8. Oaks at Earle Assembly of God church, Crittenden Co., not only had leaf cupping, but entire leaf tips were displaying chlorosis and necrosis, plus canopies were dying back.



Table 1. Sites from which at least one photo was taken showing probable or possible symptoms consistent with a plant growth regulator herbicide in 2021. Symptoms were documented at all of these sites in previous years.

Record #	Obs. Date	Site Name	Latitude	Longitude
498	7/1/2021	Cypert Cemetery	34.49051	-90.9559
541	8/12/2021	Joe Hogan State Fish Hatchery	34.76825	-91.9098
543	8/13/2021	Eventide Cemetery	34.54962	-90.9048
544	8/13/2021	Delta Heritage Trail SP--Lick Creek	34.53356	-90.7691
545	8/13/2021	Helena Welcome Center	34.50354	-90.6052
546	8/13/2021	Lagrange Cemetery	34.64868	-90.729
547	8/13/2021	Lon Mann Cotton Research Station	34.73316	-90.7671
551	8/18/2021	Parkin Archeological SP	35.27757	-90.5583
552	8/18/2021	Earle Assembly of God	35.27789	-90.47
553	8/18/2021	Gibson Bayou Cemetery	35.30631	-90.4593
554	8/18/2021	Marked Tree Cemetery	35.52217	-90.4318
555	8/18/2021	St. Francis Sunken Lands WMA--Payneway	35.54388	-90.4841
556	8/18/2021	St. Francis Sunken Lands WMA--Waterfowl Rest Area	35.5911	-90.4692
557	8/18/2021	Big Lake NWR--Mud Island	35.85039	-90.1254
558	8/18/2021	Keiser Northeast Research and Extension Center	35.67415	-90.0864
559	8/20/2021	Swifton Sand Ponds Natural Area	35.85817	-91.102
560	8/20/2021	Landmark Church	36.45366	-90.585
561	8/20/2021	Stateline Sand Ponds Natural Area	36.49196	-90.6032
564	8/20/2021	Chalk Bluff Natural Area	36.47772	-90.1632
565	8/18/2021	Big Lake WMA--Mallard Lake	35.87309	-90.0941
566	8/18/2021	New Jefferson Church	35.69485	-90.0993