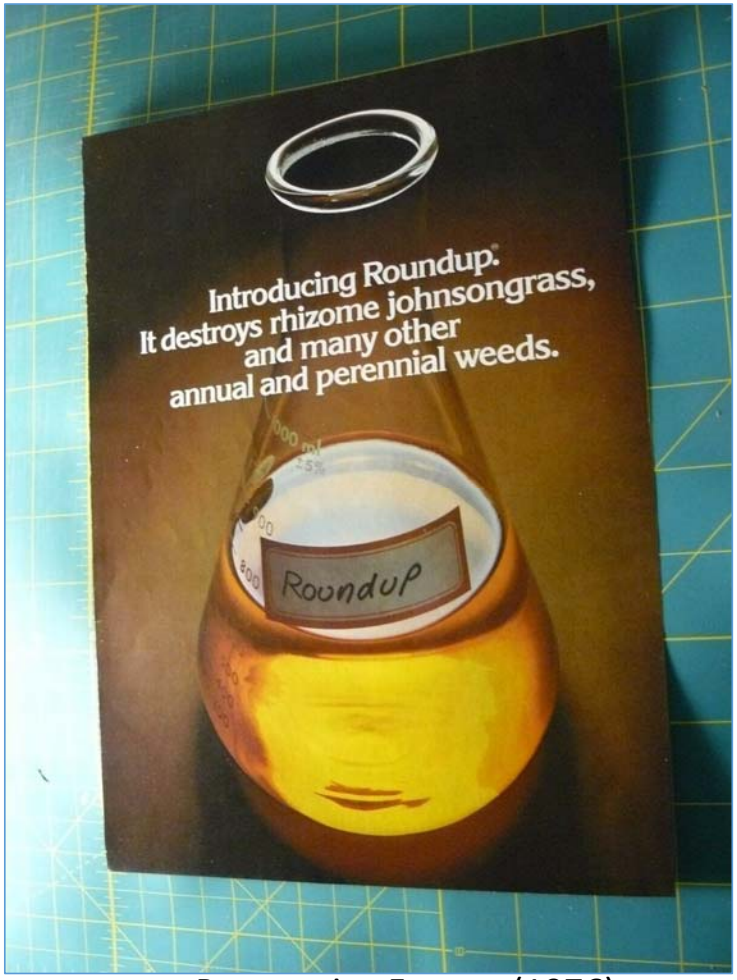
Everglades Cooperative Invasive Species Management Area

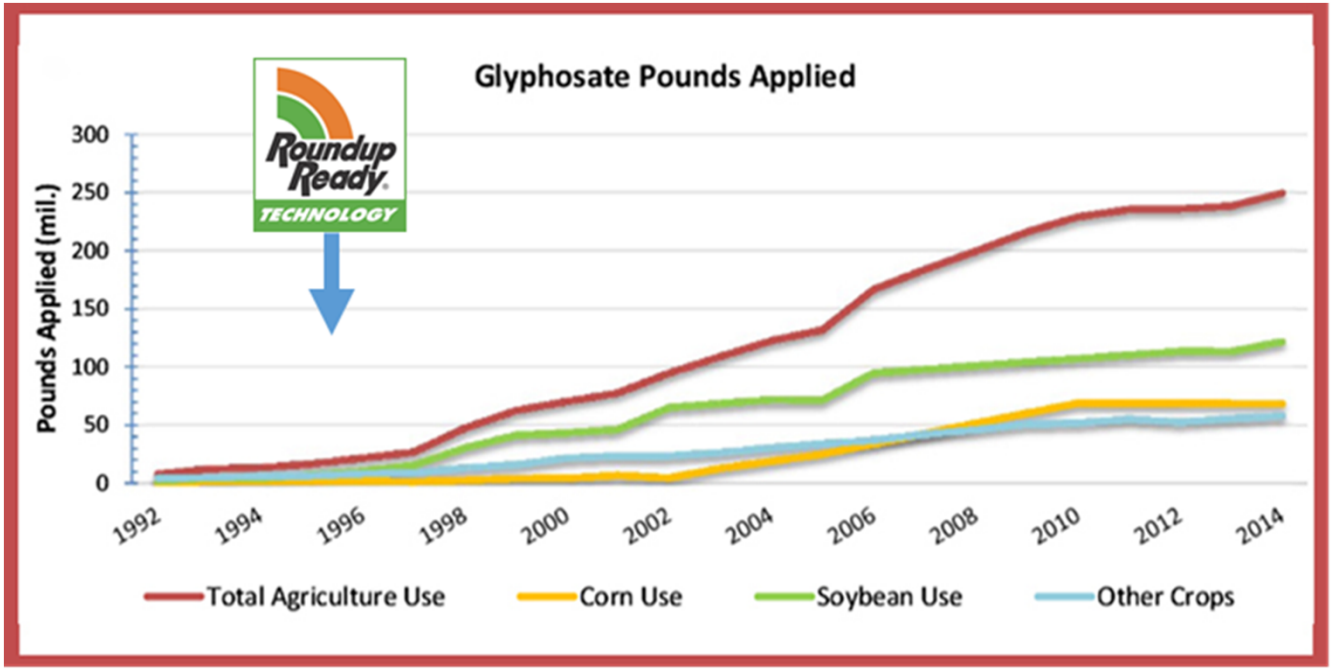
Glyphosate Education, Litigation, and Emerging Environmental Issues

Stephen F. Enloe, Brett Bultemeier
University of Florida - IFAS

2021 Everglades Invasive Species Summit July 21, 2021



Progressive Farmer (1976)



Benbrook *Environ Sci Eur (2016) 28:3*

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Glyphosate has been widely used in natural areas and aquatic systems for decades

https://www.wshu.org/post/conn-environmental-officials-battling-invasive-reeds-salt-marshes#stream/0

https://blog.nature.org/science/2013/10/28/adirondacks-rapid-response-an-invasives-success-story/loosestrife-spraying/

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How did we get from “one of the safest herbicides to use” to 125,000+ claims and lawsuits?

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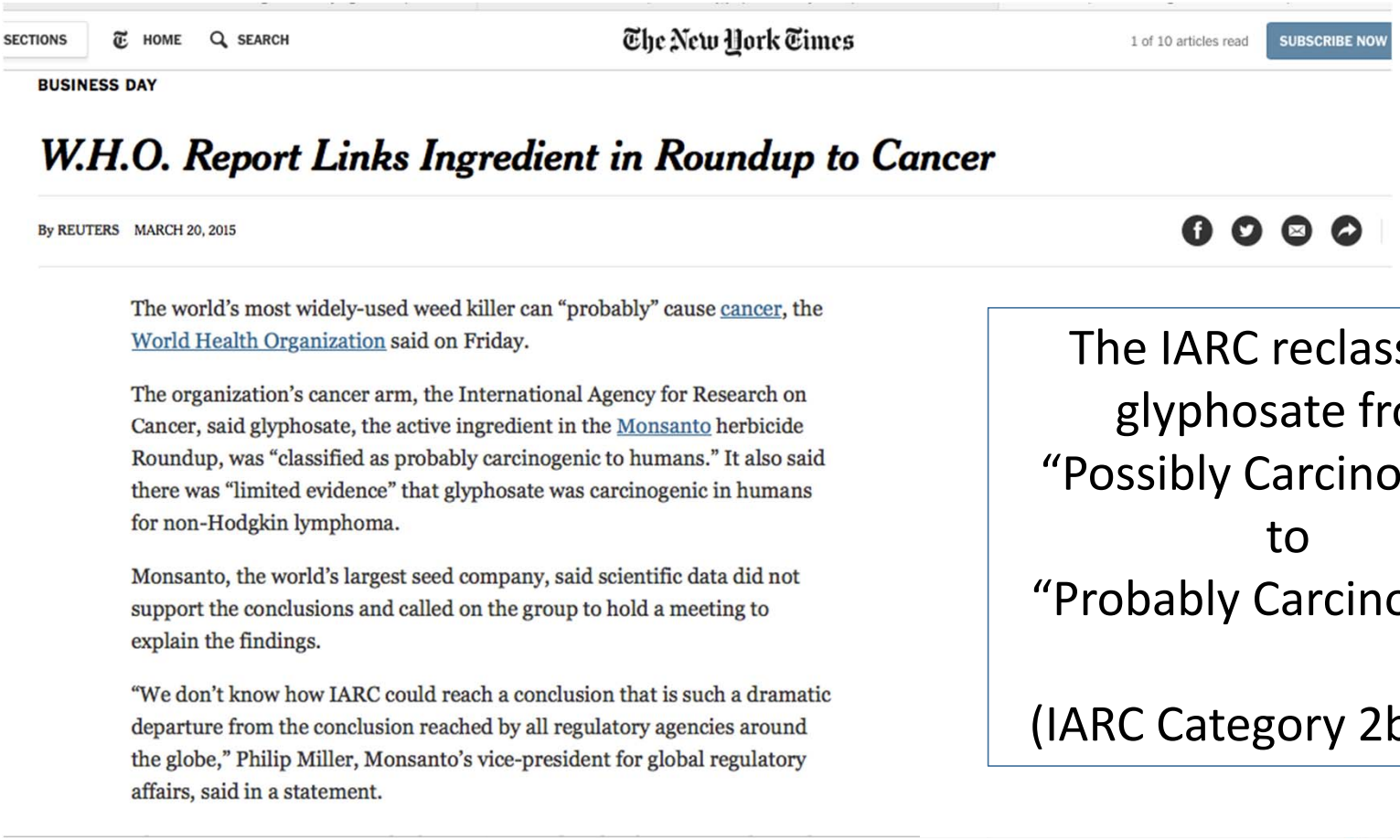
March 20, 2015



SECTIONS HOME SEARCH The New York Times 1 of 10 articles read SUBSCRIBE NOW

BUSINESS DAY

W.H.O. Report Links Ingredient in Roundup to Cancer

By REUTERS MARCH 20, 2015

The world's most widely-used weed killer can "probably" cause cancer, the World Health Organization said on Friday.

The organization's cancer arm, the International Agency for Research on Cancer, said glyphosate, the active ingredient in the Monsanto herbicide Roundup, was "classified as probably carcinogenic to humans." It also said there was "limited evidence" that glyphosate was carcinogenic in humans for non-Hodgkin lymphoma.

Monsanto, the world's largest seed company, said scientific data did not support the conclusions and called on the group to hold a meeting to explain the findings.

"We don't know how IARC could reach a conclusion that is such a dramatic departure from the conclusion reached by all regulatory agencies around the globe," Philip Miller, Monsanto's vice-president for global regulatory affairs, said in a statement.

The IARC reclassified glyphosate from "Possibly Carcinogenic" to "Probably Carcinogenic"

(IARC Category 2b to 2a)

July 2017: Enter Proposition 65

California Office of Environment Health Hazard Assessment proposes glyphosate cancer warning label under Prop 65

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2018 and 2019 brought three startling trial verdicts

Jury Awards $80 Million In Damages In Roundup Weed Killer Cancer Trial

March 27, 2019 · 8:31 PM ET

RICHARD GONZALES

Monsanto ordered to pay $289m as jury rules weedkiller caused man's cancer

Court finds in favor of Dewayne Johnson, first person to take Roundup maker to trial

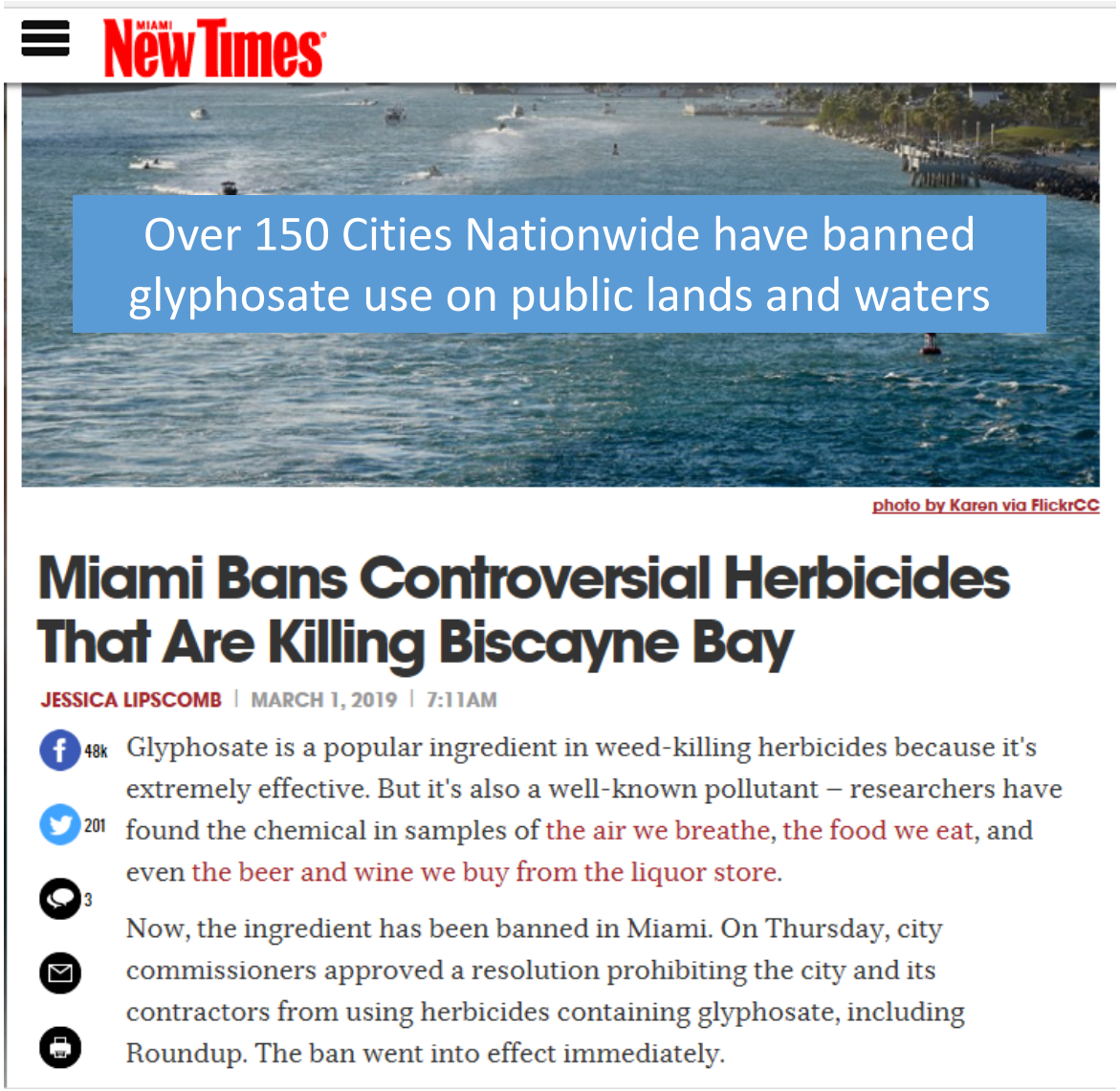
Over $2 Billion Verdict in Third Trial Against Monsanto

Michael Pilliod, Brent Wisner, Michael Baum, Alberta Pilliod, Alva Pilliod, Robert F. Kennedy, Jr. and Michael Miller

2019-2020

Glyphosate Bans enacted in FL

- Indian River County
- Fort Myers
- Key West
- Martin County
- Miami Beach
- North Miami
- Port St. Lucie
- Satellite Beach
- Sebastian
- Stuart
- Vero Beach



2020-2021: Bayer has maintained glyphosate is safe, but has officially settled >75% of the cases

The New York Times

Roundup Maker to Pay $10 Billion to Settle Cancer Suits

Bayer faced tens of thousands of claims linking the weedkiller to cases of non-Hodgkin's lymphoma. Some of the money is set aside for future cases.

- $9.6 billion for current claims
- $2 billion for future claims (Rejected)

May 27, 2021
10:58 AM EDT
Last Updated 2 months ago

Litigation

Bayer to rethink Roundup in U.S. residential market after judge nixes $2 bln settlement

New Roundup cancer trials loom despite Bayer settlement efforts

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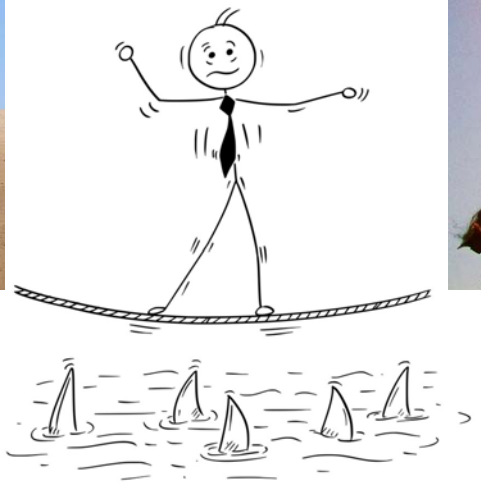
What has been our response to this issue?



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Glyphosate Education Activities in FL (2018-2021)

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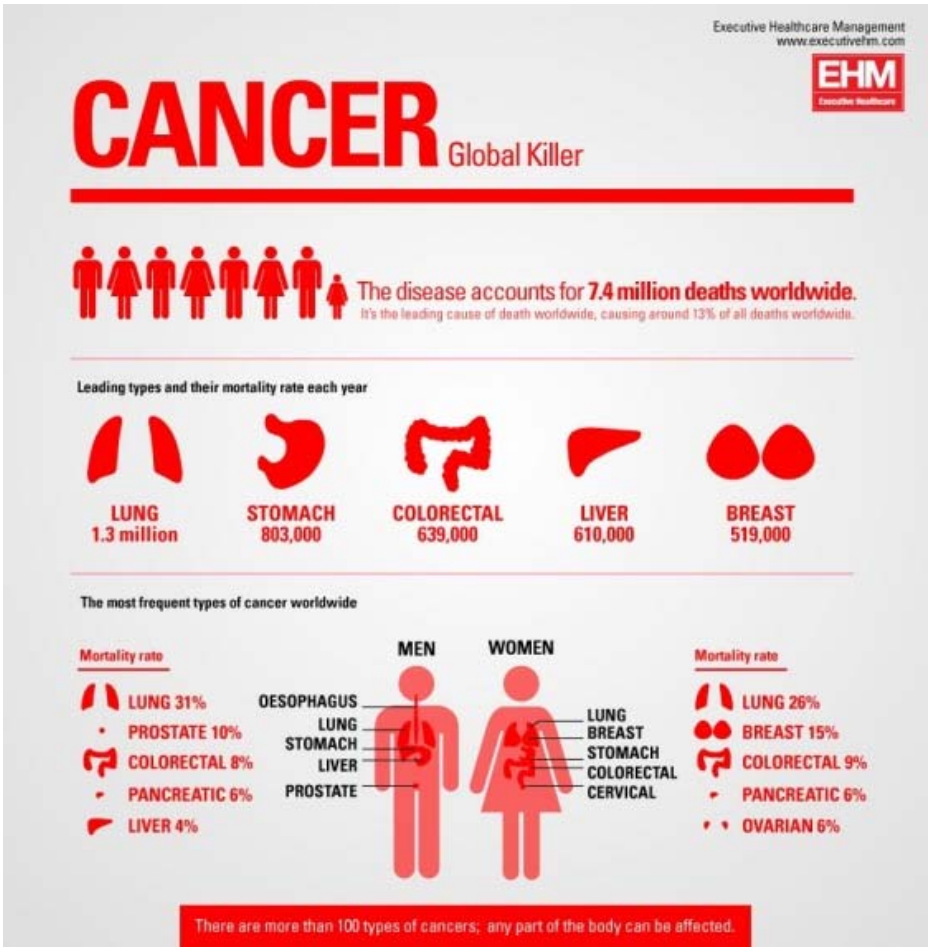
Lesson 1. Cancer is a very PERSONAL and EMOTIONAL issue



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Lesson 2. Everyone got hit with a ton of questions

- Got consistent on messaging
  - Administrators, Communications, County Agents, General Counsel
- Produced a one pager explaining where UF/IFAS stands on the issue
- Recorded webinars
- Avoided social media battles

UF|IFAS UNIVERSITY of FLORIDA

Talking Points
Glyphosate

UF/IFAS is committed to safety and supports integrated pest management as the first line of defense against weeds and other pests, including the use of glyphosate and other pesticides. We are monitoring developments in recent litigation to ensure that the University of Florida is in compliance with applicable laws and regulations.

Environmental Protection Agency Findings

On Dec. 12, 2017 the U.S. Environmental Protection Agency issued draft risk assessments concerning the potential effects of glyphosate on human health and the environment. These assessments were publicized by EPA, which noted in a Dec. 18, 2017 news release that the draft human health risk assessment "concludes that glyphosate is not likely to be carcinogenic to humans." (**https://www.epa.gov/pesticides/epa-releases-draft-risk-assessments-glyphosate**)

According to the Dec. 18 news release, EPA is scheduled to publish its proposed interim registration review decision for glyphosate in 2019. The proposed decision will outline any proposed measures to reduce the risk of glyphosate use, if such measures are needed.

A package of risk-assessment material relevant to EPA's review of glyphosate is available online. (**https://www.epa.gov/ingredients-used-pesticide-products/draft-human-health-and-ecological-risk-assessments-glyphosate**) Within the package, one section relevant to job-related glyphosate exposure is, "Glyphosate Draft Human Health Risk Assessment in Support of Registration Review." This section is 41 pages long and includes numerous references to past studies concerning glyphosate; it contains findings issued subsequent to the most recent EPA human health risk assessment, which was completed in November 2012. In that assessment, EPA officials conducted an open literature review and concluded that glyphosate should be classified as "not likely to be carcinogenic to humans."

Proper Use of Glyphosate

Given the lack of any new evidence that would steer us otherwise, we continue to recommend glyphosate as a weed control tool. Users of products containing glyphosate, or any pesticide, should carefully read and follow all label directions. The label will provide guidance regarding the clothing and/or personal protective equipment that should be worn to reduce exposure and, thus, reduce the overall risk associated with use of the product. The ultimate decision to select a particular herbicide for a particular purpose rests with the individual user (agricultural producers, homeowners, landscapers, etc) , as do all management decisions.

Importance of training

UF/IFAS Extension provides opportunities for pesticide applicators to receive certification training on the safe and proper use of pesticides, including glyphosate. Many of these applicators are not required to receive training but do so voluntarily. Many of these applicators will pursue taking and passing the required certification exams to pursue a license issued by FDACS.

There were 1,224 new licenses issued by FDACS during the past year.

There were 1,528 license renewals issued by FDACS during the past year. These applicators are required to pursue continuing education to earn their renewal. UF/IFAS Extension provides educational opportunities for these applicators to meet renewal as required by federal and state law.

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Glyphosate herbicide “alternatives” documents

UF IFAS Extension UNIVERSITY of FLORIDA

UF/IFAS PEER REVIEWED ENH1316

Use of Glyphosate and Herbicide Alternatives for Weed Control in Florida Landscape Planting Beds[1]

Chris Marble, Joe Neal, and Andy Senesac[2]

UF IFAS Extension UNIVERSITY of FLORIDA

SP 242

Integrated Management of Non-Native Plants in Natural Areas of Florida[1]

Stephen F. Enloe, Ken Langeland, Jason Ferrell, Brent Sellers, and Greg MacDonald[2]

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Lesson 3. Professionalism matters

- Don’t defend glyphosate
- Don’t take or disparage either “side”
- Avoid offhand comments
  “Glyphosate is so safe that you can _____”
- Avoid conspiracy theories
  “The IARC has a dangerous political agenda…”
  “Prop 65 is just a lawsuit cottage industry… ”
  “The EPA is in bed with the chemical companies…”

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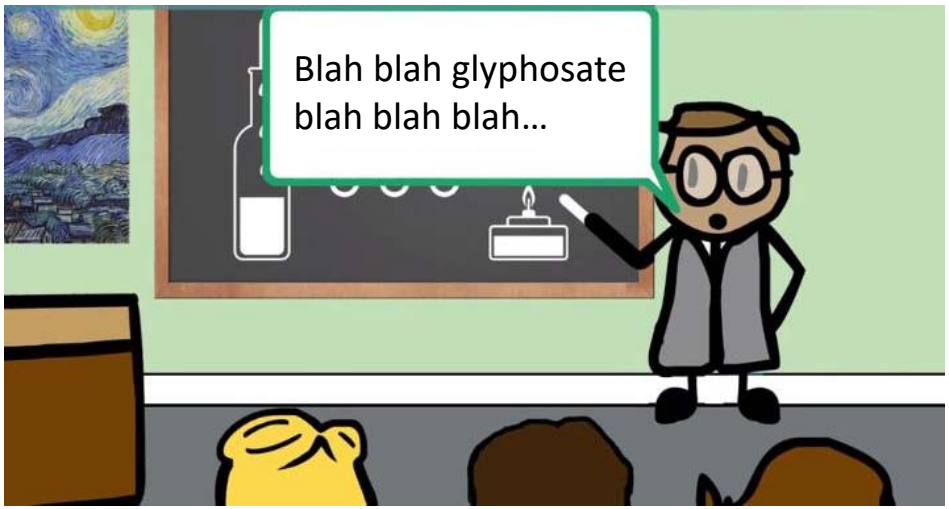
Lesson 4. Semantics and nuance are everything in this story



- Tell the story of glyphosate without trying to sell glyphosate
- Explain who IARC is and what they actually did in the reclassification
- Contrast the approaches IARC and EPA take
  - Hazard versus Risk assessment

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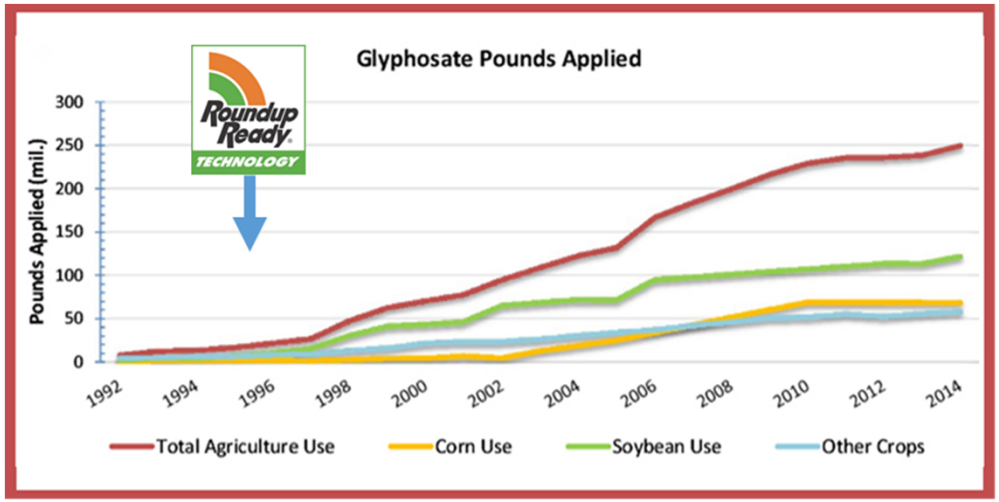
Lesson 5. Stand on the side of science

- Avoid using the “Science is settled” argument
- Advocate for more research
- Remain grounded in the data
- Stand on the principles of IPM as the basis of every discussion
- Be open to changing your position if the science needle starts moving



Benbrook *Environ Sci Eur (2016) 28:3*

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Lesson 6. Don’t overstep your area of expertise

- Don’t pretend to be Lawyers or Ecotoxicologists
- Be ready to:
  - Address an array of questions from PUBLISHED studies on glyphosate regarding:
    - Impacts on microbial communities, P-loading, persistence in air, water, soil, food residues
  - Explain the scientific method and where many “Studies” fall short
    - Good science, pseudo-science, fraud

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Lesson 7. In a room with a broad spectrum of educations and opinions, we learned:

- The goal is to share information
  - To address the middle
  - To empathize with the extremes
- To leave plenty of time for questions
- To accept we will never change the extremist viewpoints
- To recognize that science doesn't always win in the court of public opinion
  - But in most cases, it has in Florida

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Lesson 8. A lot more environmental toxicologists are now looking at glyphosate

Environment International 152 (2021) 106493

Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

Chronic exposure to glyphosate in Florida manatee

Maite De María [a,b], Cecilia Silva-Sanchez [a], Kevin J. Kroll [a], Michael T. Walsh [b], Mohammad-Zaman Nouri [a], Margaret E. Hunter [c], Monica Ross [d], Tonya M. Clauss [e], Nancy D. Denslow [a,f,*]

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ABSTRACT

Florida manatees depend on freshwater environments as a source of drinking water and as warm-water refuges. These freshwater environments are in direct contact with human activities where glyphosate-based herbicides are being used. Glyphosate is the most used herbicide worldwide and it is intensively used in Florida as a sugarcane ripener and to control invasive aquatic plants. The objective of the present study was to determine the concentration of glyphosate and its breakdown product, aminomethylphosphonic acid (AMPA), in Florida manatee plasma and assess their exposure to manatees seeking a warm-water refuge in Crystal River (west central Florida), and in South Florida. We analyzed glyphosate's and AMPA's concentrations in Florida manatee plasma (n = 105) collected during 2009–2019 using HPLC-MS/MS. We sampled eight Florida water bodies between 2019 and 2020, three times a year: before, during and after the sugarcane harvest using grab samples and molecular imprinted passive Polar Organic Chemical Integrative Samplers (MIP-POCIS). Glyphosate was present in 55.8% of the sampled Florida manatees' plasma. The concentration of glyphosate has significantly increased in Florida manatee samples from 2009 until 2019. Glyphosate and AMPA were ubiquitous in water bodies. The concentration of glyphosate and AMPA was higher in South Florida than in Crystal River, particularly before and during the sugarcane harvest when Florida manatees depend on warm water refuges. Based on our results, Florida manatees were chronically exposed to glyphosate and AMPA, during and beyond the glyphosate applications to sugarcane, possibly associated with multiple uses of glyphosate-based herbicides for other crops or to control aquatic weeds. This chronic exposure in Florida water bodies may have consequences for Florida manatees' immune and renal systems which may further be compounded by other environmental exposures such

Study: More than half of Florida's manatees have the herbicide glyphosate in their bodies

Amy Bennett Williams Fort Myers News-Press

Published 4:37 p.m. ET Mar. 22, 2021 | Updated 10:41 a.m. ET Mar. 23, 2021

View Comments

Watch as dozens of manatees congregate at Jensen's Marina on Captiva

Andrew West, News-Press

If you've seen a manatee lately – surfacing in a ring of river water, basking in their namesake park in Lee County or drifting the Gulf – odds are the creature has herbicide coursing through its veins.

Manatee Findings

- Glyphosate detected in blood plasma of 55.8% of manatees sampled over 2009-2019, n=105, mean = 0.17 ± 0.47 µg L^{-1}.
  - Brevard County n=28, Crystal River, Citrus county n=56, Kings Bay FL/GA border (n=21)
    - Glyphosate concentration increased in manatees from Brevard County and Citrus County over that time period
    - Glyphosate concentration decreased in manatees from Kings Bay over that time period

Water Sampling Findings

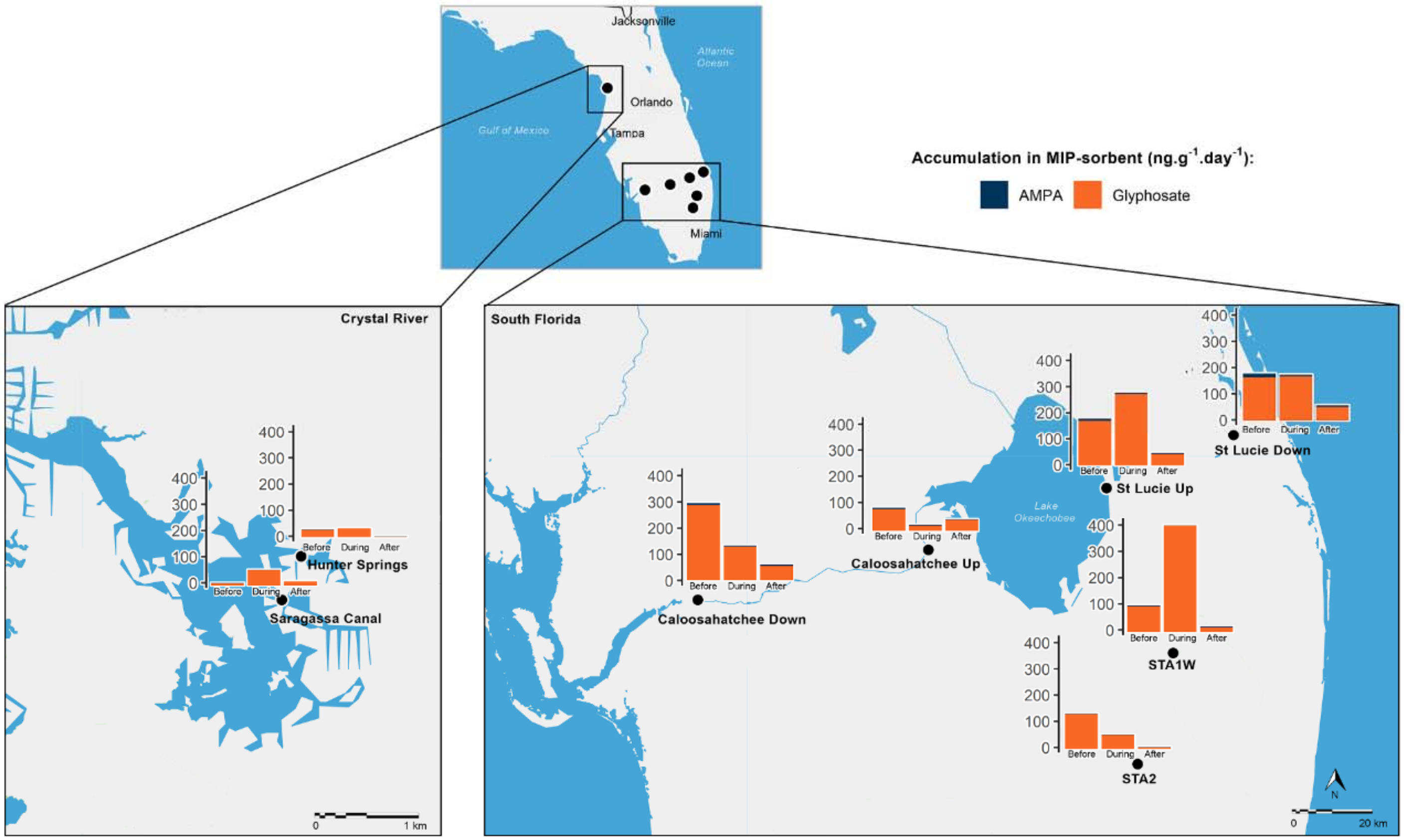

Fig. 2. Accumulation of glyphosate (orange) and AMPA (blue) (ng g^{-1} day^{-1}) per gram of molecular imprinted- sorbent (MIP-sorbent) installed in Polar Organic Chemical Integrative Sampler (POCI) per day at 8 sampling sites in Florida: Crystal River (Hunter Springs and Saragassa Canal) and at South Florida, Caloosahatchee River (Caloosahatchee up and Caloosahatchee down), the outflow of Stormwater Treatment Areas (STA1W and STA2), St. Lucie Canal (St Lucie up, and St. Lucie down), before, during and after sugarcane harvest. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

- Glyphosate was detected in all water bodies in all sample periods
- Higher concentrations from the south FL sites than Crystal River
- The concentration of glyphosate found in the water was below the maximum residue limit allowed by EPA of 0.7 mg L^{-1}

		Water concentration (µg L^{-1})					
		Glyphosate			AMPA		
Site		*Mean*	*Max*	*Min*	*Mean*	*Max*	*Min*
MIP-POCIS	CR.Hunter	0.03	0.04	0.003	0.004	0.010	0.001
	CR.Saragassa	0.04	0.09	0.010	0.002	0.003	0.001
	Calooh.DOWN	0.22	0.39	0.093	0.185	0.390	0.065
	Calooh.UP	0.07	0.11	0.029	0.040	0.070	0.020
	STA1W	0.28	0.68	0.027	0.042	0.060	0.016
	STA2	0.08	0.16	0.009	0.021	0.040	0.003
	StLucie.Down	0.18	0.27	0.084	0.224	0.330	0.081
	StLucie.UP	0.26	0.49	0.069	0.221	0.360	0.043

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Is glyphosate being found in manatees and its ubiquitous presence in some Florida water bodies something we are going to accept?

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Where are we headed?

- ~~Back to Business as Usual?~~
- Remove certain uses?
- Restricted Use Label?
- Outright ban?

- <u>STEWARDSHIP / IPM EMPHASIS</u>

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AND INVAS

Everglades Cooperative Invasive Species Management Area

Questions?

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CISMA

Think Locally, Act neighborly
invasive species know no boundaries!