

Glyphosate carcinogenicity question

Glyphosate widely used (see maps on later pp, VAAFM captures partial amount of use). Use has stabilized due to resistance issues. Glyphosate registered in 1974; RED in 1993. Currently undergoing reevaluation, process started in 2009. Human health risk assessment expected in 2017, will assess cancer and non-cancer endpoints in residential and occupational settings for glyphosate, AMPA and n-acetyl-glyphosate.

Cancer has made the most news lately.

USA:

- Early years 1985/1986 possible human carcinogen to not classifiable as human carcinogen—more data needed.
- 1991-evidence of non-carcinogenicity for humans
- 9/2015-reevaluate ‘not likely to be carcinogenic to humans’
- 9/2016-EPA issue paper regarding carcinogenicity. Sent to SAP December 2016.
- 3/2017-report from SAP finalized. Not concluded. More data needed. Equivocal studies.

Internationally:

- 3/2015-IARC (subdivision of WHO) reevaluated and determined ‘probable carcinogen’ group 2A
- 11/2015-European Food Safety Authority (EFSA) determined unlikely to pose carcinogenic hazard to humans
- 5/2016-Food & Agriculture Organization—meeting on Pesticide Residue (subdivision of WHO) unlikely to pose a carcinogenic hazard to humans from exposure through diet.
- Some individual countries have moved to ban based on IARC (France, Sweden)
- Some countries conclude unlikely to pose carcinogenic risk (Japan, Canada)

In the 2005 EPA Guidelines for Carcinogen Risk Assessment, five classification descriptors are:

- Carcinogenic to Humans
- Likely to be Carcinogenic to Humans
- Suggestive Evidence of Carcinogenic Potential
- Inadequate Information to Assess Carcinogenic Potential
- Not Likely to be Carcinogenic to Humans

EPA Proposal in 2016 Issue paper—WOE approach concludes that *glyphosate is not likely to be carcinogenic to humans. Especially at reasonable foreseeable doses.*

SAP-some agreed with EPA statement; others preferred ‘suggestive evidence of carcinogenic potential. Many noted that the data was equivocal and glyphosate exposed worker data was needed. *Essentially still wobbling around the no effect and maybe.*

Who are the SAP-

SAP chair, PhD from University of Colorado Denver and 4 panel members (PhDs) VA-MD College of Veterinary Medicine, National Institute of Health, Indiana University, Howard University

FQPA Review group, 10 members from Universities and private toxicology groups

Questions asked of the SAP-

1) the completeness, transparency, and appropriateness of the Agency's methods to collect references for the evaluation; [Answer: In general, ok. Provided some suggestions for improvement](#)

2) the epidemiological studies investigating the potential for associations between glyphosate exposure and cancer outcomes; [Answer: Studies reviewed appropriately. Outcomes as such:](#)

- No association with Hodgkins lymphoma, solid tumors and leukemia (but limited data)
- No association with multiple myelomas
- No conclusion can be made about Non-Hodgkins lymphoma. However, some indicated that the data supported no positive relationship. Others disagreed. Ended on "cannot exclude the possibility of observed positive associations between glyphosate and NHL". Biases and limitations remain.

3) the laboratory rodent carcinogenicity studies for glyphosate; [Answer: Could have done better should be re-looked at. Panel acknowledged challenges with lack of reproducibility in data.](#)

4) assays investigating the genotoxic potential of glyphosate; [Answer: well done by the EPA.](#)

5) the completeness, transparency, and scientific quality of the Ag; [Answer: acceptable](#)

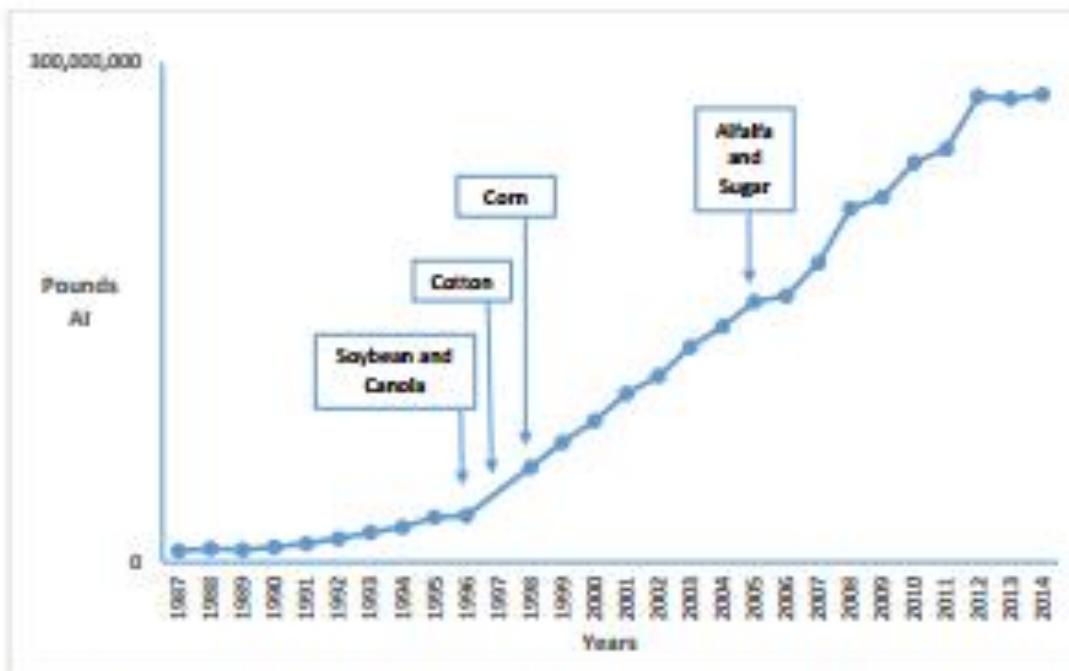


Figure 1.2. Glyphosate agricultural usage (pounds applied annually) from 1987- 2014. Boxes indicate years when glyphosate-resistant crops were introduced. Source: Proprietary Market Research Data (1987 – 2014).



Figure 1.5. Map of estimated agricultural use for glyphosate in 1994 from USGS (http://water.usgs.gov/nawqgmp/usage/map/show_map.php?year=1994&map=GLYPHOSATE&allow=1)

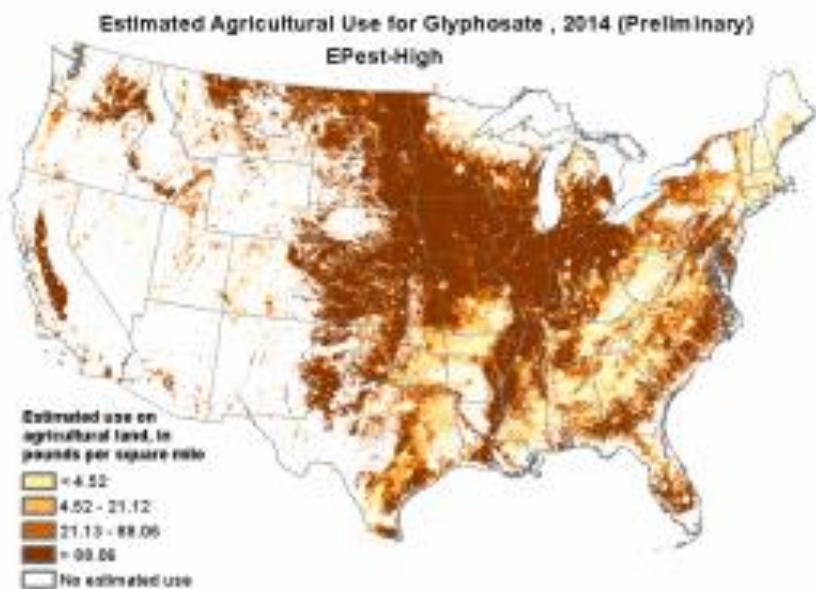


Figure 1.6. Map of estimated agricultural use for glyphosate in 2014 from USGS (http://water.usgs.gov/awqi/pmp/usage/map/show_map.php?year=2014&map=GLYPHOSATE&bb=0)