



BEYOND PESTICIDES

701 E Street, SE ■ Washington DC 20003
202-543-5450 phone ■ 202-543-4791 fax
info@beyondpesticides.org ■ www.beyondpesticides.org

The Next Generation of Genetically Engineered Crops

Take Action to Stop Agent Orange Corn and Soybeans from Reaching your Dinner Plate

USDA is set to approve the planting of Dow AgroSciences' new Genetically Engineered (GE) 2,4-D resistant crops in communities around the country. That's an unacceptable move that puts our health, the food supply, and the environment in danger. Here's why:

A Toxic Legacy

- 2,4-D made up one-half of the deadly defoliant Agent Orange, which decimated Vietnam's forest ecosystems and permanently scarred the War's veterans.¹
- The chemical has a long history of contamination with dioxin, one of the most noxious, carcinogenic substances known to humankind.²
- Human exposure to 2,4-D has been linked to increased risk of cancer, particularly non-Hodgkin lymphoma,^{3,4} endocrine disruption,⁵ Parkinson's Disease,⁶ reduced sperm counts,⁷ and birth defects.⁸

Contamination of Our Food and Homes

- Approval of 2,4-D Ready corn is sure to increase the presence of the chemical in our food supply; the herbicide is already allowed by EPA on over 75 different crops.^{9,10}

¹ Thomas Fuller. 4 Decades on, U.S. Starts Cleanup of Agent Orange in Vietnam. 2012. *The New York Time*. <http://www.nytimes.com/2012/08/10/world/asia/us-moves-to-address-agent-orange-contamination-in-vietnam.html?pagewanted=all>

² "Dichlorophenoxyacetic acid, 2,4- (2,4-D): environmental aspects. 1989. International Programme on Chemical Safety. Environment Health Criteria 84.. *United Nations Environment Programme, the International Labour Organisation, and the World Health Organization*. <http://www.inchem.org/documents/ehc/ehc/ehc84.htm>

³ Lennart Hardell, and Eriksson, M. (1999) A case-control study of non-Hodgkin lymphoma and exposure to pesticides. *Cancer* 85, 1353-1360.

⁴ Ibrahim, M.A., Bond, G.G., Burke, T.A., Cole, P., Dost, F.N., Enterline, P.E., Gough, M., Greenberg, R.S., Halperin, W.E., McConnell, E., and et al.1991. Weight of the evidence on the human carcinogenicity of 2,4-D. *Environmental Health Perspectives* 96, 213-222.

⁵ Garry, V.F., Tarone, R.E., Kirsch, I.R., Abdallah, J.M., Lombardi, D.P., Long, L.K., Burroughs, B.L., Barr, D.B., and Kesner, J.S. 2001. Biomarker correlations of urinary 2,4-D levels in foresters: genomic instability and endocrine disruption. *Environmental Health Perspectives* 109, 495-500.

⁶ Occupation and Risk of Parkinsonism, A multicenter Case-Control Study. Tanner, Caroline, MD, et al. 2009. *Arch Neurol*. 2009;66(9):1106-1113

⁷ Lerda, D., and Rizzi, R. 1991. Study of Reproductive Function in Persons Occupationally Exposed to 2,4-Dichlorophenoxyacetic Acid (2,4-D). *Mutation Research* 262, 47-50.

⁸ Garry, V.F., Schreinemachers, D., Harkins, M.E., and Griffith, J. 1996. Pesticide Applicators, Biocides, and Birth Defects in Rural Minnesota. *Environmental Health Perspectives* 104, 394-399.

⁹ Government Printing Office. 2014. Title 40, Code of Federal Regulations. §180.142. 2,4-D; tolerances for residues.

<http://www.ecfr.gov/cgi-bin/text-idx?SID=d7c7eda45cd5f1d04404c7a13fe556e6&node=40:25.0.1.1.27.3.19.19&rgn=div8>

- Increased spraying of 2,4-D in farm communities across the country increases the likelihood of tracking this chemical into homes: Studies have also documented that once tracked indoors, 2, 4-D can stay on carpeted surfaces for up to a year.¹¹ A 2003 study found 63% of houses in the U.S. contained traces of 2,4-D.¹²

Increased Pesticide Use and Superweeds

- Just like Roundup Ready crops caused a proliferation of resistant weeds,¹³ 2,4-D Ready crops will do the same.
- And just like Roundup Ready crops vastly increased the use of the glyphosate (Roundup's active ingredient),¹⁴ 2,4-D Ready crops will do the same, with increased hazards to human health and the environment.
- Even without the widespread planting of 2,4-D Ready crops, a 2012 *Weed Science* study uncovered weed populations already resistant to applications of the herbicide.¹⁵

Effect on Beneficial Organisms and Other Wildlife

- In birds, 2,4-D exposure reduced hatching success and caused birth defects. It also indirectly affects birds by destroying their habitat and food source.¹⁶
- The herbicide also has negative effects on a range of beneficial insects. It reduces offspring numbers in honey bees, kills predatory beetles and ladybug larvae.¹⁷
- 2,4-dichlorophenol, a breakdown product of 2,4-D, is extremely toxic to earthworms, 15 times more toxic than 2,4-D itself.¹⁸
- 2,4-D is extremely toxic to fish and can bio-accumulate inside fish.¹⁹

¹⁰ Also see: *Beyond Pesticides' Eating with a Conscience Database*:

<http://www.beyondpesticides.org/organicfood/conscience/navigation.php>

¹¹ Nishioka MG, Burkholder HM, Brinkman MC, Gordon SM. 1996. Measuring lawn transport of lawn applied herbicide acids from turf to home: Correlation of dislodgeable 2,4-D turf residues with carpets dust and carpet surface residues. *Environmental Sci and Tech*. 30:3313-3320.

¹² Rudel, Ruthann, et al. "Phthalates, Alkylphenols, Pesticides, Polybrominated Diphenyl Ethers, and Other Endocrine-Disrupting Compounds in Indoor Air and Dust." *Environmental Science and Technology* 37(20):4543-4553.

¹³ Mortensen, David A. 2012. Navigating a Critical Juncture for Sustainable Weed Management. *Bioscience*. 62(1):75-84.

¹⁴ Benbrook, Charles. 2012. Impacts of genetically engineered crops on pesticide use in the U.S. -- the first sixteen years. *Environmental Sciences Europe*. 24:24

¹⁵ Mark L. Bernards, Roberto J. Crespo, Greg R. Kruger, Roch Gaussoin, and Patrick J. Tranel. 2012. A Waterhemp (*Amaranthus tuberculatus*) Population Resistant to 2,4-D. *Weed Science*: July-September 2012, Vol. 60, No. 3, pp. 379-384.

¹⁶ Duffard, FL, Traini, and A Evangelista de Duffard. 1981. Embryotoxic and teratogenic effects of phenoxy herbicides. *Acta Physiol. Latinoam*. 31:39-42; Lutz H and Y Lutz-Ostertag. 1972. The action of different pesticides on the development of bird embryos. *Adv. Exp. Med. Biol*. 27: 127-150.

¹⁷ Cox, Caroline. 1999. Herbicide Factsheet: 2,4-D: Ecological Effects. *Journal of Pesticide Reform* 19:3pp14-19.

¹⁸ Roberts, BL and HW Dorough. 1984. Relative toxicity of chemicals to the earthworm. *Environmental Toxicology and Chemistry* 3:67-78.

¹⁹ Wang, Y., C. Jaw and Y. Chen. 1994. Accumulation of 2,4-D and glyphosate in fish and water. *Water Air Soil Pollut*. 74pp397-403.

Effects on Farmworkers

- Studies have reported that occupational exposure to 2,4-D is associated with an increased risk of Parkinson's disease.²⁰
- Research shows that there is an association of increased risk of non-Hodgkin lymphoma for those who work on farms that use 2,4-D.²¹
- Research by EPA suggests that babies born in counties where high rates of chlorophenoxy herbicides are applied to farm fields are significantly more likely to be born with birth defects of the respiratory and circulatory systems, as well as defects of the musculoskeletal system, such as clubfoot, fused digits, and extra digits. These birth defects are 60% to 90% more likely in counties with higher 2,4-D application rates.²²

Organic: An Effective Alternative

- Organic agriculture offers a viable, scalable path towards a future without chemical tainted communities, fields, foods, farmworkers, air, streams, and groundwater.
- A 13-year Iowa State University Study released in 2011 found organic production returns about \$200 per acre more than conventional agriculture, and produced comparable yields and healthier soils.²³
- A 2012 report from the American Academy of Pediatrics found that organic food provides distinct health benefits by way of reducing exposure to pesticides, especially children.²⁴

²⁰ Tanner, C., et al 2009. Occupation and Risk of Parkinsonism: A Multicenter Case-Control Study. *Archives of Neurology*, 66:9pp.1106-1113. <http://archneur.jamanetwork.com/article.aspx?articleid=797977>

²¹ Mills PK, Yang R, Riordan D, 2005. Lymphohematopoietic cancers in the United Farm Workers of America (UFW), 1988-2001. *Cancer Causes Control*, 16:7pp823-30. <http://www.ncbi.nlm.nih.gov/pubmed/16132792>

²² Garry, VF, et al 1996. Pesticide applicers, biocides, and birth defects in rural Minnesota. *Environmental Health Perspectives*, 104:4pp.394-399. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1469337/>

²³ Iowa State University Leopold Center for Sustainable Agriculture. 2011. Long-running experiment shows organic farming is profitable.<http://www.leopold.iastate.edu/news/11-15-2011/long-running-experiment>

²⁴ Joel Forman, MD, Janet Silverstein, MD. 2012. Organic Foods: Health and Environmental Advantages and Disadvantages. *American Academy of Pediatrics*.
<http://pediatrics.aappublications.org/content/early/2012/10/15/peds.2012-2579>