

# FACT SHEET

March, 2003

## 2,4-Dichlorophenoxyacetic acid

(2,4-D Herbicide)

Exposure to the herbicide 2,4-D can cause damage to the central and peripheral nervous systems and some studies have linked 2,4-D with increases in tumor formation and birth defects. 2,4-D is an active agent in more than 1,500 pesticides used in agriculture, forestry maintenance, lawns, and in home and garden applications, making it one of the most widely used pesticides in the United States.

### Health Effects

A person may be exposed to 2,4-D by breathing in mists or getting it on the skin during manufacturing or application. Others, including children and pregnant women, may be exposed to 2,4-D by direct contact with plants that have been sprayed with 2,4-D or by drinking water or eating food contaminated with 2,4-D.

Exposure to high levels of 2,4-D can damage the nervous system in humans; symptoms include stiffness of arms and legs, muscle weakness, incoordination, fatigue, anorexia, loss of bladder control, stupor, coma, and, in some instances, death. Long-term exposure to high levels of 2,4-D can cause damage to the nervous system, kidneys, liver, and blood in humans. Human exposure to lower levels of 2,4-D can cause severe eye and skin irritation and gastrointestinal problems, including nausea, vomiting, and diarrhea.

Some studies have linked 2,4-D with an increased risk of birth defects and non-Hodgkin's lymphoma, a cancer of the white blood cells, in humans. Crop workers and pesticide applicators, particularly those who are pregnant, are of great concern due to their frequent contact with 2,4-D and other pesticides. The World Health Organization (WHO) has classified 2,4-D as a moderately hazardous pesticide and the International Agency for Research on Cancer (IARC) has termed it a possible human carcinogen.

### Common Uses



2,4-D herbicide is used to kill broadleaf weeds. 2,4-D is applied to agricultural crops, including wheat, rice, and corn; grasslands used for cattle grazing; and along roadsides and railways. 2,4-D frequently is found as an active agent in herbicides used in home and garden applications and for the control of aquatic vegetation. 2,4-D also was used as a jungle defoliant and was a major component (about 50%) of Agent Orange used during the Vietnam War.

### Alternatives

Alternative methods for controlling agricultural pests can reduce the need for herbicides. Integrated pest management (IPM) and organic farming, gardening and residential pest control strategies are two alternatives.

IPM relies on using multiple non-chemical and chemical means to prevent and eliminate weeds. Limited amounts of the safest possible pesticides are used only when necessary. Organic farming, gardening, and residential pest control rely on mechanical, physical, and biological strategies to prevent and control weed growth; herbicides are not used at all. For example, weeds in lawns can be controlled through proper mowing, irrigation, overseeding, and mechanical weeding.

### References

- Cavieres, M.F., Jaeger, J., Porter, W. 2002. Developmental toxicity of commercial herbicide mixture in mice: I. effects on embryo implantation and litter size. *Environmental Health Perspectives* 110(11): 1081-1085.
- Colborn, T, vom Saal, F.S., Soto, A.M. 1993. Developmental effects of endocrine-disrupting chemicals in wildlife and humans. *Environmental Health Perspectives* 101(5): 378-384.
- Cox, C. 1997. Managing weeds at home and in our communities: Band-Aids are not enough. *Journal of Pesticide Reform* 17(1): 2-6.
- Garry, V.F., Schreinemachers, D., Harkins, M.E., Griffith, J. 1996. Pesticide applicators, biocides, and birth defects in rural Minnesota. *Environmental Health Perspectives* 104(4): 394-399.
- Green, E. September 17, 2002. Study links weed killer to reproductive problems. *The Nation*.
- Hayes, H.M., et al. 1991. Case-control study of canine malignant lymphoma: Positive association with dog owner's use of 2,4-dichlorophenoxyacetic acid herbicides. *Journal of the National Cancer Institute* 83: 1226-1231.
- Kamrin, M.A. (Ed.). 1997. *Pesticide profiles: Toxicity, environmental impact, and fate*. New York, NY: Lewis Publishers.
- Olkowski, W., Doar, S., Olkowski, H. 1991. *Common-sense pest control*. Taunton Pr.
- Occupational Safety and Health Administration (OSHA). 2002. Occupational Safety and Health Guideline for 2,4-D. [http://www.osha-slc.gov/SLTC/healthguidelines/2\\_4d-dichlorophenoxyaceticacid/recognition.html](http://www.osha-slc.gov/SLTC/healthguidelines/2_4d-dichlorophenoxyaceticacid/recognition.html).
- Pesticide Action Network – UK. 2002. 2,4-D fact sheet. <http://www.pan-uk.org/pestnews/Actives/24d.htm>.
- Pesticide Management Programme, Cornell University. 1993. Exttoxnet data sheet on 2,4-D. (<http://pmep.cce.cornell.edu/profiles/exttoxnet/24d-captan/24d-ext.html>).
- Pimentel, D. & Lehman, H. (Eds.). 1993. *The pesticide questions: Environment, economics and ethics*. New York, NY: Chapman and Hall.
- Uhler, B. 1992. Alternatives: LawnCare without pesticides. *Journal of Pesticide Reform* 12(2): 38-39.
- U.S. Environmental Protection Agency (EPA). 2002. Technology Transfer Network Air Toxics Website: 2,4-D (2,4-Dichlorophenoxyacetic Acid). <http://www.epa.gov/ttn/atw/hlthef/di-oxyac.html>.
- World Health Organization (WHO). 1998. 2,4-Dichlorophenoxyacetic acid (2,4-D). In *Guidelines for drinking-water quality*, 2<sup>nd</sup> ed. [http://www.who.int/water\\_sanitation\\_health/GDWQ/Chemicals/24dichlorophenousum.htm](http://www.who.int/water_sanitation_health/GDWQ/Chemicals/24dichlorophenousum.htm).
- Zahm, S.H., Weisenburger, D.D., Babbitt, P.A., Saal, R.C., Vaught, J.B., Cantor, K.P., and Blair, A. 1990. A case-control study of non-Hodgkin's lymphoma and the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) in eastern Nebraska. *Epidemiology* 1(5): 349-56.

### Additional Resources

The Gardeners Guide to Common Sense Pest Control by Olkowski, Doar & Olkowski

Northwest Coalition for Alternatives to Pesticides: <http://www.pesticide.org>

Pesticide Action Network North America: <http://panna.igc.org>

Pesticide Management Programme, Cornell University: <http://pmep.cce.cornell.edu/profiles/exttoxnet/24d-captan/24d-ext.html>