



# BEYOND PESTICIDES

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Statement of  
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ON

Bill No. 2491, Provisions Governing Pesticides and Genetically Engineered Crops  
Kauai, Hawaii  
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Beyond Pesticides is writing to support efforts in Kauai (Bill No. 2491) to establish provisions governing the use of pesticides and genetically engineered (GE) crops. As a national, grassroots membership organization, Beyond Pesticides represents community-based groups and a range of people seeking to improve protections from pesticides and their associated use on GE crops. Our membership includes residents of Hawaii's Kauai County and spans the 50 states and groups around the world.

In the absence of federal or state action, the time is right for Kauai County to increase protections for its residents from hazardous pesticide use. Many people and organizations, both in Kauai County and across the state of Hawaii, have contacted Beyond Pesticides within recent years concerning pesticide poisonings directly related to the use of highly toxic pesticides by agrichemical corporations. The proposed Bill No. 2491 would make substantive progress towards protecting the health of Kauai County residents from chemical trespass, and we applaud these efforts.

## The Hazards of Pesticides Have Been Well Documented

The growth in pesticide use and genetically engineered crops dependent upon herbicide applications is a troubling development in light of public exposure to chemicals that can cause cancer, toxic sensitization, neurological problems and a range of short-term effects such as dizziness, headaches, rashes and mental disorientation, even when label directions are followed. Numerous studies correlate pesticide exposure with diseases that are all too common in the United States, so it cannot be suggested that pesticide product registration by U.S. Environmental Protection Agency (EPA) creates adequate assurance that the residents of Kauai are protected from hazards. This applies even to general use pesticides that can be used in and around homes. Of the 30 most commonly used pesticides, 17 are associated with cancer, 18 with disruption of the endocrine/hormonal system, 19 with reproductive effects, 14 with neurotoxicity, 24 with kidney/liver damage, 11 with birth defects, and 25 are sensitizers or

irritants.<sup>1</sup> Children are particularly vulnerable to pesticides because they take in more of the chemical relative to their body weight and have developing organ systems. Studies show that children exposed to pesticides suffer elevated rates of leukemia, brain cancer, soft tissue sarcoma, and non-Hodgkin lymphoma.<sup>2,3</sup> Reports link past pesticide use and exposure to Parkinson's and Alzheimer's disease in the elderly.<sup>4</sup> Numerous studies link pesticide exposure in pregnant women to increased risk of adverse birth outcomes,<sup>5,6,7</sup> cancer in children after birth,<sup>8,9,10,11</sup> and developmental disorders such as ADHD<sup>12,13</sup> and decreased mental capacity.<sup>14,15</sup>

Despite rhetoric to the contrary, these vulnerable population groups are inadequately protected by the risk assessments EPA uses to register chemicals. The testing protocol for some health endpoints, such as poisoning that disrupts the endocrine system (impacting human development at miniscule doses) has not been finalized or implemented by EPA, as required by statute. And some issues are simply not addressed, such as the synergic effects of pesticides mixed with other pesticides or with pharmaceuticals. Given this, Hawaii's pesticide registration apparatus in the Department of the Agriculture is unfortunately dependent on a federal system that is inadequate.

Restricted use pesticides, used most often in agricultural production, pose a significant hazard to residents who live, work, or go to school near where they are applied. Many restricted use agricultural pesticides have been banned for use in homes and gardens due to the adverse risks they pose to residents, particularly children. Studies show a high propensity for those living near agricultural areas to accumulate these hazardous chemicals in their homes.<sup>16</sup>

The restricted use insecticide, chlopyrifos and general use herbicides, glyphosate and 2,4-D provide instructive examples as to why local governance is necessary to protect Kauai's citizens.

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<sup>1</sup> Beyond Pesticides. 2013. Health Effects of 30 Commonly Used Lawn Pesticides. <http://www.beyondpesticides.org/lawn/factsheets/30health.pdf>

<sup>2</sup> Ma, X. et al. 2002. "Critical Windows of Exposure to Household Pesticides and Risks of Childhood Leukemia." *EHP* 110(9): 955-960 ; Zahm, S., et al.1998"Pesticides and Childhood Cancer." *EHP* 106(Supp. 3): 893-908

<sup>3</sup> Buckley, J.D., et al. 2000. *Cancer* 89(11):2315-232

<sup>4</sup> Baldi, I, et al. *Am J Epidemiol* 2003; 157:409-414.

<sup>5</sup> Chevrier C, Limon G, Monfort C, Rouget F, Garlantézec R, Petit C, et al. 2011.. *Environ Health Perspect*. doi:10.1289/ehp.1002775

<sup>6</sup> Brender, JD., et al. 2010. *Ann Epidemiol*. 20(1):16-22

<sup>7</sup> de Siqueira, MT et al. 2010. *Bull Environ Contam Toxicol*. 84(6):647-51

<sup>8</sup> Rosso, A.L., et al. 2008. *Cancer Causes Control* 19(10):1201-1207

<sup>9</sup> Bunin, G.R., et al. 1994. *Cancer Epidemiology, Biomarkers and Prevention* 3:197-204

<sup>10</sup> Tsai, J., et al. 2006. *Int J Hyg Environ Health* 209(1):57-64

<sup>11</sup> Van Maele-Fabry G, Lantin AC, Hoet P, Lison D. 2011. *Environ Int*. 37(1):280-91

<sup>12</sup> Marks AR, Harley K, Bradman A, Kogut K, Barr DB, et al. 2010. *Environ Health Perspect*. doi:10.1289/ehp.1002056

<sup>13</sup> Garry, V.F. et al. 2002. *Environ. Health Persp*. 110 (Suppl. 3):441-449

<sup>14</sup> Bouchard MF, Chevrier J et al. 2011. *Environ Health Perspect* :- .doi:10.1289/ehp.1003185

<sup>15</sup> Horton, et al. 2011. *Pediatrics*, Online February 7, 2011 (doi:10.1542/peds.2010-0133

<sup>16</sup> Harnly, ME, et al. 2009. Pesticides in dust from homes in an agricultural area. *Environ Sci Technol*;43(23):8767-74.

## Chlorpyrifos

Chlorpyrifos is a restricted use pesticide banned from residential applications after the U.S. Environmental Protection Agency (EPA) determined that cumulative exposure resulted in serious adverse health outcomes, especially for children. Chlorpyrifos is a cholinesterase inhibitor which binds irreversibly to the active site of an essential enzyme for normal nerve impulse transmission, acetylcholine esterase (AChE), inactivating the enzyme. Studies have documented that exposure to low levels of chlorpyrifos during pregnancy can impair learning, change brain function and alter thyroid levels of offspring into adulthood, especially females.<sup>17,18,19,20</sup> Research finds that children exposed to high levels of chlorpyrifos had mental development delays, attention problems, attention-deficit/hyperactivity disorder problems, and pervasive developmental disorder problems at 3 years of age.<sup>21,22</sup> A study from the University of California at Berkeley, examining families in the intensive agricultural region of Salinas Valley, California, found that IQ levels for children with the most exposure to organophosphate class chemicals such as chlorpyrifos were a full seven IQ points lower than those with the lowest exposure levels. The Berkeley team also found that every tenfold increase in measures of organophosphates detected during a mother's pregnancy corresponded to a 5.5 point drop in overall IQ scores in the 7-year-olds.<sup>23</sup> Researchers from Mount Sinai School of Medicine also found that prenatal exposure to organophosphates is negatively associated with cognitive development, particularly perceptual reasoning, with evidence of effects beginning at 12 months and continuing through early childhood.<sup>24</sup> A systematic meta-analysis of the literature on organophosphate pesticide conducted by researchers at University College of London found long-term low-level exposure to these pesticides produced lasting damage to

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<sup>17</sup> Haviland et al. 2009. Long-term sex selective hormonal and behavior alterations in mice exposed to low doses of chlorpyrifos in utero. *Reproduc. Tox.* 29(1):74-9

<sup>18</sup> Abou-Donia MB, et al. 2006. In utero exposure to nicotine and chlorpyrifos alone, and in combination produces persistent sensorimotor deficits and Purkinje neuron loss in the cerebellum of adult offspring rats. *Arch Toxicol.*;80(9):620-31.

<sup>19</sup> Abdel-Rahman A, et al. 2003. Increased expression of glial fibrillary acidic protein in cerebellum and hippocampus: differential effects on neonatal brain regional acetylcholinesterase following maternal exposure to combined chlorpyrifos and nicotine. *J Toxicol Environ Health A.*;66(21):2047-66.

<sup>20</sup> Icenogle LM, et al. 2004. Behavioral alterations in adolescent and adult rats caused by a brief subtoxic exposure to chlorpyrifos during neurulation. *Neurotoxicol Teratol*;26(1):95-101.

<sup>21</sup> Rauh VA. 2006. Impact of prenatal chlorpyrifos exposure on neurodevelopment in the first 3 years of life among inner-city children. *Pediatrics*;118(6):e1845-59.

<sup>22</sup> Rauh V, Arunajadai S, Horton M, Perera F, Hoepner L, Barr DB, et al. 2011. Seven-Year Neurodevelopmental Scores and Prenatal Exposure to Chlorpyrifos, a Common Agricultural Pesticide. *Environ Health Perspect* 119:1196-1201.

<sup>23</sup> Bouchard MF, Chevrier J, Harley KG, Kogut K, Vedar M, Calderon N, et al. 2011. Prenatal Exposure to Organophosphate Pesticides and IQ in 7-Year-Old Children. *Environ Health Perspect* 119:1189-1195.

<sup>24</sup> Engel, S. et al. 2011. Prenatal Exposure to Organophosphates, Paraoxonase 1, and Cognitive Development in Childhood. *Environ Health Perspect* 119:1182-1188.

neurological and cognitive functions.<sup>25</sup>

The delay in EPA's restriction of this highly toxic chemical, registered in 1965 but not restricted until 2001 due to concerns regarding risks posed to children, and the continued allowance of its use in agricultural areas near where people live, work, and go to school place the onus of citizen protection on local governments, and represents the failure of EPA's risk assessment process to protect residents of the United States from pesticide hazards.

### Genetically Engineered Crops and Pesticide Use

Genetically engineered crops developed to tolerate herbicide applications present a very real threat to communities near where these crops are being grown and developed. Despite industry claims to the contrary, the legacy of GE agriculture has not increased crop yields and decreased pesticide use, but instead an exponential growth of pesticide use and herbicide-resistant weeds that require increasingly toxic chemicals in order to control.<sup>26</sup> The presence of open-air experimental GE fields in Kauai means that the risks posed to Kauai residents by increased chemical use will progressively increase as new GE crops are developed to withstand more and more powerful chemicals.

### Glyphosate

Since glyphosate's registration with EPA in 1974, its popularity has increased dramatically due to erroneous claims that it is of low toxicity. The first genetically engineered crops deregulated by the United States Department of Agriculture (USDA) were developed to tolerate repeated applications of glyphosate throughout the growing season. Studies have investigated glyphosate and reported that it is associated with increased risk of non-Hodgkin Lymphoma (NHL), genetic damage, neurological impacts and endocrine disruption. Researchers have also determined that the "inert" ingredients in glyphosate products, especially polyethoxylated tallowamine or POEA - a surfactant commonly used in glyphosate and other herbicidal products, are even more toxic than glyphosate itself.

One study found that people exposed to glyphosate are 2.7 times more likely to contract non-Hodgkin Lymphoma (NHL).<sup>27</sup> In 2002, a study of Swedish men showed that glyphosate exposure was significantly associated with an increased risk of NHL, and

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<sup>25</sup> Ross, SM, et al. 2013. Neurobehavioral problems following low-level exposure to organophosphate pesticides: a systematic and meta-analytic review. *Crit. Review Toxicol.* 43(1):21-44

<sup>26</sup> Benbrook, Charles. 2012. Impacts of genetically engineered crops on pesticide use in the U.S. -- the first sixteen years. *Environmental Sciences Europe.* 24:24

<sup>27</sup> Hardell, L., & Eriksson, M. 1999. A Case-Control Study of Non-Hodgkin Lymphoma and Exposure to Pesticides. *Cancer*, 85(6), 1353-1360.

hairy cell leukemia- a rare subtype of NHL.<sup>28</sup> Further, a 2003 review of studies conducted on farmers by researchers at the National Cancer Institute also shows that exposure to glyphosate is associated with an increased incidence of NHL.<sup>29</sup> The American Cancer Society states that non-Hodgkin lymphoma is a cancer that starts in cells called lymphocytes, which are part of the body's immune system.<sup>30</sup> Glyphosate has been suggestively associated with an increased risk of multiple myeloma, according to an Agricultural Health Study published in 2005.<sup>31</sup> The chemical has also been associated with ADD/ADHD,<sup>32</sup> increased risks of late abortion,<sup>33</sup> and endocrine disruption.<sup>34</sup>

The extensive use of glyphosate in GE-focused agriculture has caused a proliferation of weeds resistant to the chemical.<sup>35</sup> Instead of encouraging best management practices to reduce the risk of resistant weeds, agrichemical companies have opted to develop new GE varieties resistant to herbicides even more potent and hazardous to human health than glyphosate.

## 2,4-D

USDA is currently considering the deregulation of a new variety of corn developed to withstand applications of the highly potent phenoxy herbicide 2,4-D, currently a general use herbicide commonly used in commercial landscaping and agriculture. Once part of the deadly duo of chemicals that made up Agent Orange, 2,4-D can also be contaminated with several forms of dioxin, including 2,3,7,8-TCDD, a known carcinogen. Studies have also documented that once tracked indoors from lawns, 2,4-D can stay indoors (on carpets) for up to a year.<sup>36</sup> A 2003 study found 63% of houses in the U.S.

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<sup>28</sup> Hardell L, Eriksson M, & Nordstrom M. 2002. Exposure to pesticides as risk factor for non-Hodgkin's lymphoma and hairy cell leukemia: pooled analysis of two Swedish case-control studies. *Leuk Lymphoma*, 43(5), 1043-1049.

<sup>29</sup> De Roos, et al. 2003. Integrative assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men. *Occup Environ Med*, 60(9).

<sup>30</sup> American Cancer Society. Detailed Guide: Lymphoma, Non-Hodgkin Type: What Is Non-Hodgkin Lymphoma? Cancer Reference Information. Available at [http://www.cancer.org/docroot/CRI/content/CRI\\_2\\_4\\_1X\\_What\\_Is\\_Non\\_Hodgkins\\_Lymphoma\\_32.asp](http://www.cancer.org/docroot/CRI/content/CRI_2_4_1X_What_Is_Non_Hodgkins_Lymphoma_32.asp)

<sup>31</sup> De Roos, A. J. D., Blair, A., Rusiecki, J. A., Hoppin, J. A., Svec, M., Dosemeci, M., Sandler, D. P., & Alavanja, MC .2005. Cancer Incidence among Glyphosate-Exposed Pesticide Applicators in the Agricultural Health Study. *Environmental Health Perspectives*, 113(1), 49-54.

<sup>32</sup> Garry, V. F., et al. 2002. Birth defects, season of conception, and sex of children born to pesticide applicators living in the Red River Valley of Minnesota, USA. *Environ Health Perspect*, 110(Suppl 3), 441-449.

<sup>33</sup> Arbuckle, T.E., Z. Lin, and L.S. Mery. 2001. An Exploratory Analysis of the Effect of Pesticide Exposure on the Risk of Spontaneous Abortion in an Ontario Farm Population. *Environmental Health Perspectives* 109:851-857.

<sup>34</sup> Walsh, L. P., McCormick, C., Martin, C., & Stocco, D. M. 2000. Roundup Inhibits Steroidogenesis by Disrupting Steroidogenic Acute Regulatory (StAR) Protein Expression. *Environ Health Perspect*, 108, 769-776.

<sup>35</sup> Mortensen, David A. 2012. Navigating a Critical Juncture for Sustainable Weed Management. *Bioscience*. 62(1):75-84.

<sup>36</sup> 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.

contained traces of 2,4-D.<sup>37</sup>

Several scientific studies point to 2,4-D's association with cancer, particularly non-Hodgkin's lymphoma.<sup>38,39</sup> There is also a wealth of relevant scientific information available indicating that 2,4-D disrupts the endocrine/hormone system. A study by Garry et al. found a direct correlation of urinary levels of 2,4-D with serum levels of luteinizing hormone (LH) and high testosterone levels at the time of highest exposure to 2,4-D, suggesting a direct effect on hormonal levels by the herbicide.<sup>40</sup> LH, produced by the pituitary gland, stimulates the production of testosterone and helps regulate the menstrual cycle and ovulation. Fluctuations in these hormones may affect human fertility. Other studies have found that abnormal sperm,<sup>41</sup> and higher rates of birth defects,<sup>42</sup> were observed in farmers with long-time exposure to 2,4-D.

The proliferation of GE crops, particularly new, experimental varieties in the state of Hawaii require, in the absence of state or federal action, local government to control their use in a way that best protects its residents and the unique ecosystem of the state.

### Mandatory Disclosure of Pesticide Use

Beyond Pesticides supports measures to disclose pesticide use that includes 72 hour prior notification and the listing in a publicly available report federal or state registration or permit numbers, commercial product names and active ingredients, the total quantity used of each pesticide, and the geographic location where each pesticide was used.

It is critical that residents be provided at least 72 hours notification before a pesticide application is to take place. The people of Kauai deserve a chance to plan a way to avoid unwanted pesticide exposure.

Residents of Kauai have the right to know what chemicals are applied near where they live, work, and go to school. Particularly with children, because most of the symptoms of pesticide exposure, from respiratory distress to difficulty in concentration, are common in kids and may also have other causes, pesticide-related illnesses often go unrecognized and unreported.<sup>43</sup> Publicly

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<sup>37</sup> 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.

<sup>38</sup> Lennart Hardell, and Eriksson, M. (1999) A case-control study of non-Hodgkin lymphoma and exposure to pesticides. *Cancer* 85, 1353-1360.

<sup>39</sup> 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.

<sup>40</sup> 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.

<sup>41</sup> 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.

<sup>42</sup> 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.

<sup>43</sup> National Environmental Education and Training Foundation. 2002. National Strategies for Health Care Providers: Pesticides Initiative Implementation Plan. Washington DC

accessible reports on pesticide use will provide crucial information that physicians and those that suspect they were poisoned by pesticides can use to treat possible pesticide-related illnesses. By knowing the amount, location, and active ingredient of a pesticide, physicians can better tailor their treatments to the specific health issues relating to pesticide poisonings.

### Buffer Zones

Beyond Pesticides supports measures to restrict the use of pesticides near public areas such as schools, hospitals, residential areas, and public roadways, and on sensitive environmental areas such as streams, rivers, and shorelines.

However, we suggest that the mandatory buffer zone be increased from 500 ft. to at least 1.5 miles. Though, it should be noted that even this sized buffer zone would not provide complete protection from pesticide use, as pesticides have been known to drift for numerous miles through wind and rain.<sup>44</sup> A study published in the *American Journal of Health* shows that living within 2600 feet of an agricultural area increased the risk of brain cancer two-fold, with astrocytoma increased by 6.7 fold.<sup>45</sup> A 2008 ecological study analyzing incidence data from U.S. children ages 0-14 years diagnosed with cancer between 1995 and 2001 and residence in a county with agricultural activity finds an elevated risk for malignant bone tumors and for subtype osteosarcoma at high agricultural activity.<sup>46</sup> A study from the University of California, Los Angeles revealed that counties using restricted use pesticides for agricultural purposes have about a 40% increase in Parkinson's Disease mortality when compared to counties reporting no restricted use pesticides.<sup>47</sup> Thus, we hope the Council will consider increasing the buffer zone for pesticide use.

### Experimental Pesticides

Experimental pesticides, either unregistered pesticides or those undergoing testing for new uses, can pose significant health risks to residents who live, work, or go to school near experimental testing fields. Beyond Pesticides supports efforts to restrict the open air testing of these chemicals. In order to prevent the type of contamination or drift referenced above, a requirement that only allows enclosed testing would provide adequate protections for Kauai's residents.

### Conclusion

Beyond Pesticides believes that the people of Kauai County have a right to know what chemicals may be tracked in or allowed to drift into their homes, schools and workplaces. They have a right to 72 hours prior knowledge before a pesticide is applied so that they may be able to avoid that area. They have a right not to be exposed to novel pesticides or experimental uses

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<sup>44</sup> Atmospheric Deposition of PAH, PCB and Organochlorine Pesticides to Corpus Christi Bay. Texas A&M Geochemical and Environmental Research Group. Presented at the National Atmospheric Deposition Program Committee Meeting.

<sup>45</sup> Aschengrau, A., et al. 1996. "Cancer Risk and Residential Proximity to Cranberry Cultivation in Massachusetts." *Am. J. of Public Health* 86(9):1289-96

<sup>46</sup> Carrozza, S.E., et al. 2008. *Environ Health Perspect* 116(4):559-565

<sup>47</sup> Ritz B, and Yu F. 2000. *International Journal of Epidemiology* 29(2):323-329

for existing pesticides that are associated with adverse human health effects. The hazards of pesticides are well documented and, in the absence of adequate, protective action to govern the use of these chemicals at the state or federal level, warrant local action to protect citizen health.

We hope the Kauai County Council will seriously consider the documented hazards of pesticide use and enact this ordinance to govern their use in a way that adequately protects even Kauai's most sensitive citizens. Beyond Pesticides remains available to the Council if any further questions or concerns surround this testimony.

Respectfully,

Jay Feldman  
Executive Director