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Administrator Gina McCarthy
U.S. Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington, DC 20460

June 30, 2014

RE: Dow AgroSciences application to amend their 2,4-D choline salt herbicide for use on 2,4-D tolerant corn and soybeans.

Docket EPA-HQ-OPP-2014-0195

Dear Administrator McCarthy:

Consumers Union urges you not to register a double herbicide mix of 2,4-Dichlorophenoxyacetic acid (2,4-D) and glyphosate ("Enlist Duo™"), which would be used in conjunction with crops that have been genetically engineered to resist these herbicides.

We are concerned that the risks to public health, fruit and vegetable growers and the environment far outweigh the short-term benefits to row crop growers of controlling weeds with 2,4-D.

Risks to Farmers and Farmworkers

Scientific studies show that farmers and farmworkers who apply 2,4-D or work in fields sprayed with 2,4-D are at risk of numerous negative health impacts. Such negative health effects include higher rates of non-Hodgkin lymphoma,¹ Parkinson's disease² and hypothyroidism.³

Studies have also found higher rates of certain kinds of cancer among farmers and farmworkers working with 2,4-D, or residents living in areas with high use of 2,4-D.⁴

Risks to Rural Residents

¹ Hoar SK, Blair A, Holmes FF, Boysen CD, Robel RJ, Hoover R and Fraumeni JF Jr. (1986) Agricultural herbicide use and risk of lymphoma and soft-tissue sarcoma. *JAMA* 256(24): 3351.

² Tanner CM, Ross GW, Jewell SA, Hauser RA, Jankovic J, Factor SA et al. (2009) Occupation and risk of parkinsonism: a multicenter case-control study. *Arch Neurol* 66(9): 1106-13.

³ Goldner WS, Sandler DP, Yu F, Shostrom V, Hoppin JA, Kamel F, LeVan TD (2013) Hypothyroidism and pesticide use among male pesticide applicators in the agricultural health study. *J Occup Environ Med* 55(10).

⁴ Mills RC and Yang RC (2007) Agricultural exposures and gastric cancer risk in Hispanic farm workers in California. *Environ Res* 104(2): 282-9.

Rural residents living near farm fields where 2,4-D is applied are exposed in numerous ways, and 2,4-D even enters the homes of rural residents. When researchers collected dust samples from vacuum cleaners in 112 homes in rural Iowa, 95% of home dust samples contained 2,4-D.⁵

Studies have found higher rates of negative health impacts in communities where 2,4-D use is higher. These studies cannot specifically pinpoint 2,4-D as the cause, but should not be disregarded.

Several studies have reported higher rates of certain cancers in communities with high exposure to chlorophenoxy herbicides, including 2,4-D.⁶ The higher rates of non-Hodgkin lymphoma seen in farmers and farmworkers working in fields sprayed with 2,4-D have also been observed in residents living in areas where 2,4-D exists in high concentrations.⁷

A study, using urinary levels of 2,4-D as measured by NHANES III survey data, has linked 2,4-D exposure with adverse changes in lipid levels and glucose metabolism, which may predispose to heart disease and diabetes.⁸

A study of rural communities in Minnesota found increased rates of birth malformations in areas where chlorophenoxy herbicides, including 2,4-D, are applied.⁹ Anomalies of the circulatory/respiratory and musculoskeletal/integumental system are significantly increased in areas with higher use of 2,4-D.¹⁰

While there is conflicting evidence in animal studies of the teratogenicity of 2,4-D, the population studies showing increased rates of birth defects in areas with high herbicides use — 2,4-D as well as other pesticides — suggests that there may be effects on humans not seen in animals, or more likely, synergistic effects from the use of multiple pesticides. The possible synergistic effects of 2,4-D with other pesticides are especially important to consider given that Enlist Duo™ would contain two herbicides as active ingredients.

2,4-D exposure has also been shown to lower sperm count,¹¹ and the State of California determined in 2005 that 2,4-D meets the criteria for listing it under Prop 65 as causing reproductive toxicity.

Risks to Fruit and Vegetable Growers

⁵ Ward MH, Lubin J, Giglierano J, Colt JS, Wolter C, Bekiroglu N, Camann D, Hartge P and Nuckols JR (2006) Proximity to crops and residential exposure to agricultural herbicides in Iowa. *Environmental Health Perspectives* 114(6): 893-897.

⁶ Schreinemachers DM, Creason JP and Garry VF (1999) Cancer mortality in agricultural regions in Minnesota. *Environmental Health Perspectives* 107(3): 205-211; and Schreinemachers DM (2000) Cancer mortality in four northern wheat-producing states. *Environmental Health Perspectives* 108(9): 873-881.

⁷ Fontana A, Picoco C, Masala G, Prastaro C, Vineis P (1998) Incidence rates of lymphomas and environmental measurements of phenoxy herbicides: ecological analysis and case-control study. *Arch Environ Health* 53(6): 384-7.

⁸ Schreinemachers DM (2010) Perturbation of lipids and glucose metabolism associated with previous 2,4-D exposure: a cross-sectional study of NHANES III data, 1988-1994. *Environmental Health* 9(11).

⁹ Garry VF, Schreinemachers D, Harkins ME, Griffith J (1996) Pesticide applicers, biocides, and birth defects in rural Minnesota. *Environmental Health Perspectives* 104(4): 394-399.

¹⁰ Schreinemachers DM (2003) Birth malformations and other adverse perinatal outcomes in four US wheat-producing states. *Environmental Health Perspectives* 111(9): 1259-1264.

¹¹ Lerda D and Rissi R (1991) Study of reproductive function in persons occupationally exposed to 2,4-Dichlorophenoxyacetic acid (2,4-D). *Mutat Res* 272: 47-50.

We are concerned with the impact of 2,4-D spray drift and volatilization on farmers who do not use the genetically engineered 2,4-D resistant corn and soybean varieties, or who grow fruits or vegetables that are susceptible to 2,4-D.

2,4-D causes injury to broadleaf (non-cereal) crops, like soybeans, dry beans, green beans, peas, tomatoes, grapes, cucumbers, squash, melons, pumpkins, and other fruits and vegetables, particularly at flowering stage.

According to the Save Our Crops Coalition (SOCC), a grassroots coalition of specialty crop producers, a survey of state pesticide control officials listed 2,4-D as the herbicide most often involved in pesticide drift incidents.

Specialty crop growers have voiced concerns that an increase in 2,4-D use will threaten their crops and livelihoods.¹² Specialty crops — fruits and vegetables as well as wine grapes — are an integral part of diverse and healthy rural farm communities. Vineyards contribute to rural economies through tourism. Any harm to the harvests of specialty crop growers has serious implications for public health, as fruits and vegetables are an integral part of a healthy diet and therefore integral for improving public health.

While volatilization and spray drift are important issues with 2,4-D, Dow AgriSciences claims that their choline salt formulation of 2,4-D in Enlist Duo™ “minimized potential for physical drift, [and] ultra-low volatility”¹³, which should lead to reduced economic damage to nearby crops, as well as reduced human exposure. The U.S. Environmental Protection Agency (EPA) has agreed, to a certain extent, with Dow as they have registered Enlist Duo™ for use on HT (herbicide tolerant) corn and soy. We disagree that Dow has demonstrated that Enlist Duo™ “minimized potential for physical drift,” as there are numerous data gaps in the 2,4-D volatilization and spray drift data that Dow submitted to the EPA. First, Dow did not measure growth and weight parameters in plants in the vicinity of sprayed fields, so there are no direct data on effects of spray drift. However, EPA assumed that sprayed 2,4-D would stay only on the treated fields and that drift would not occur, so they did not require Dow to submit any actual data on drift effects on plants outside of sprayed fields. EPA ignored studies that have demonstrated that spray drift happens,¹⁴ and even ignored their own fact sheet on spray drift which notes that “the drift of spray and dust from pesticide applications can expose people, wildlife, and the environment to pesticide residues that can cause health and environmental effects and property damage.”¹⁵ Second, Dow failed to do the appropriate necessary environmental tests for a mixture of 2,4-D and glyphosate, so there are no data on toxicological effects from simultaneous exposure to 2,4-D and glyphosate. Even EPA noted that “there could be additional toxicological effects (synergistic or additive) because of the presence of two

¹² Parker, Jason. Symposium Proceedings, The New 2,4-D and Dicamba-Tolerant Crops: October 31 to November 1, 2011. Available online at http://riskanalysis.osu.edu/sites/drupal-riskanalysis.web/files/OSU_symposium_proceedings.pdf?

¹³ Dow Chemical Company. 2014. Enlist Duo™ Herbicide Moves Forward in Regulatory Process. At: <http://www.dow.com/news/press-releases/article/?id=6497>

¹⁴ Lee SJ, Mehler L, Bechman J, Diebolt-Brown B et al. 2011. Acute pesticide illnesses associated with off-target pesticide drift from agricultural applications: 11 States, 1998-2006. *Env. Health Perspectives*, 119(8): 1162-1169 At: <http://ehp.niehs.nih.gov/wp-content/uploads/119/8/ehp.1002843.pdf> ; and Tupper KA, Kegley SE, Jacobs N, Marques E et al. 2012. Pesticide Drift Monitoring in Minnesota, June 13, 2006-August 13, 2009. Pesticide Action Network North America, San Francisco. At: http://www.panna.org/sites/default/files/TechReport_MN-Drift_May2012.pdf

¹⁵ EPA. 2014. Pesticide Spray and Dust Drift. At: epa.gov/pesticides/factsheets/spraydrift.htm

herbicides.”¹⁶ Given these data gaps, and the fact that EPA’s assumption that sprayed 2,4-D would stay on treated field is contradicted by both scientific studies and the Agency’s own statements on the issue, EPA must redo their assessment of the impact on endangered species, taking into account the likelihood of 2,4-D drift to non-sprayed areas as well as the cumulative environmental toxicity of multiple pesticides and herbicides that may be used with 2,4-D.

The approval of Enlist Duo™ will address a short term need of grain growers, who will be able to control weeds until resistance to 2,4-D will render Enlist Duo™ ineffective. During that short time period, fruit and vegetable growers, as well as farmers choosing to grown soybeans that are not resistant to 2,4-D, will likely experience damage to their crops through increased spray drift and volatilization of 2,4-D.

Risks to biodiversity

In terms of acute (short term) toxicity, 2,4-D is considered to be “slightly toxic” to “moderately toxic” to mammals and birds. Any increase in the use of 2,4-D on farms would lead to an increase in exposure of wildlife.

Drift and/or volatilization of 2,4-D and glyphosate in Enlist Duo™ would affect plant biodiversity in the vicinity of sprayed fields, which would indirectly affect wildlife and pollinator biodiversity through diminished plant habitats.¹⁷

Conclusion

If the EPA were to approve Dow’s application for 2,4-D-glyphosate herbicide to be used on 2,4-D-resistant crops, USDA estimates a three to seven-fold increase of use of 2,4-D on crops by 2020 compared to 2011 levels for agriculture in the United States.¹⁸ The potential impact on the health of farmworkers, farmers and rural communities in the vicinity of sprayed fields could be far greater than the 3- to 7-fold increased use of 2,4-D in agriculture would suggest. For example, as of 2011, some 5.4 million pounds of 2,4-D were used on corn and on soybeans. By 2020, USDA estimates 2,4-D use on corn could be from 32 to 85.9 million pounds, for an increase of 6- to 13-fold; for soybeans, the figures are 31 to 70.1 million pounds, for an increase of 6- to 13-fold.¹⁹ A study by a Washington State scientist estimated that 2,4-D use on corn alone could increase 30-fold between 2010 and 2019.²⁰ EPA has not considered these potential health impacts in their risk-benefit analysis.

¹⁶ EPA. 2013. EFED (Environmental Fate and Effects Division) Environmental Risk Assessment of Proposed Label for Enlist (2,4-D Choline Salt), New Uses on Soybean with DAS 68416-4 (2,4-D Tolerant) and Enlist (2,4-D + Glyphosate Tolerant) Corn and Field Corn. Docket EPA-HQ-OPP-2014-0195.

¹⁷ Josephine Johnson. Symposium Proceedings, The New 2,4-D and Dicamba-Tolerant Crops: October 31 to November 1, 2011. Available online at http://riskanalysis.osu.edu/sites/drupal-riskanlys.web/files/OSU_symposium_proceedings.pdf? Page 178.

¹⁸ USDA (U.S. Department of Agriculture). 2013. Dow AgroSciences Petitions (09-233-01p, 09-349-01p, and 11-234-01p) for Determinations of Nonregulated Status for 2,4-D-Resistant Corn and Soybean Varieties. Draft Environmental Impact Statement.

¹⁹ IBID

²⁰ Benbrook, CM. 2012. Impacts of genetically engineered crops on pesticide use in the U.S. – the first sixteen years. *Env. Sci. Europe*, 24: 24. At: <http://www.enveurope.com/content/pdf/2190-4715-24-24.pdf>

The dramatic increase in 2,4-D spraying on corn and soybean fields would also seriously worsen the problem of herbicide resistance. Globally, there are 16 weed species that are resistant to 2,4-D resistant weeds, including weeds in the US.²¹ Thus, approval by EPA of Enlist Duo™ would create conditions that would lead to resistant weeds. Genetically engineered glyphosate-tolerant crops—particularly corn, soy and cotton—have led to an explosion of glyphosate-tolerant weeds due to extensive and continuous use of glyphosate in such crops, a situation known as the “transgene-facilitated herbicide treadmill.”²² A study by a Washington State scientist, using USDA data, estimated that the first 16 years of planting of GE crops lead to a 527 million pound increase in herbicide use in the herbicide-tolerant crops, compared to their non-engineered counterparts.²³ Just as approval of glyphosate tolerant crops lead to a huge increase in herbicide use and an explosion in glyphosate tolerant weeds, the approval of 2,4-D-tolerant corn and soy could also drastically increase the number of 2,4-D-tolerant weeds, thereby leading to the future loss of 2,4-D efficacy against resistant weeds.

Consequently, we believe that the potential risks of increased use of 2,4-D outweigh the potential benefits, which will be short-term. The EPA writes that 2,4-D resistant corn and soybean plants are “intended to provide farmers with new plants to help address the problem of weeds that have developed resistance to other herbicides,” but fail to point out that the weed problems were created by the use of GE glyphosate-tolerant crops in the first place. Thus, to come up with another GE (i.e. 2,4-D) tolerant crop to deal with the weeds created by the use of GE glyphosate tolerant crops makes no sense as it suggests that no lessons have been learned by the epidemic of glyphosate-tolerant weeds. It is only a matter of time until weeds will develop resistance to 2,4-D, as has happened with GE glyphosate-tolerant crops, yet the EPA does not factor the short-lived nature of the 2,4-D “solution” into the risk-benefit equation.

We believe that any possible short-term benefits to farmers and to Dow Chemical Company do not outweigh the wide spectrum of known and suspected long-term risks to public health and the environment.

We urge the EPA to deny the approval of the 2,4-D and glyphosate mixture to protect human health, specialty crop growers and the environment.

Respectfully Submitted,

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²¹ Mortensen DA, Egan JF, Maxwell BD, Ryan MR and RG Smith. 2012. Navigating a critical juncture for sustainable weed management. *BioScience*, 62(1): 75-84.

²² IBID

²³ Benbrook, CM. 2012. *Op cit.*

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