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OPP Docket
Environmental Protection Agency
Docket Center (EPA/DC), (28221T)
1200 Pennsylvania Ave. NW
Washington, DC 20460-000

Docket ID # EPA-HQ-OPP-2014-0167

Re. Clopyralid, Case Number 7212

Dear Madam/Sir:

These comments are submitted on behalf of Beyond Pesticides. Founded in 1981 as a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to bridge the interests of consumers, farmers and farmworkers, Beyond Pesticides advances improved protections from pesticides and alternative pest management strategies that reduce or eliminate a reliance on pesticides. Our membership and network span the 50 states and the world.

EPA's proposed interim decision (PID) on the weed killer clopyralid is inadequate to protect property, nontarget plants, and pollinators from exposure to the chemical. Clopyralid poses unreasonable adverse effects that cannot be remedied by EPA's proposed fixes. It should not be reregistered. Clopyralid has a long history of causing environmental and property damage through drift, runoff, use of treated plant material (such as straw or grass clippings) for mulch or compost, contaminated irrigation water, and urine or manure from animals consuming treated vegetation.

Clopyralid (3,6-dichloro-2-pyridinecarboxylic acid) is an herbicide used to control broadleaf weeds on nonresidential lawns and turf, range, pastures, right-of ways and on several crops. Approximately 1.6 million pounds of clopyralid is used on 20 million acres per year in the U.S. on agricultural land, but it is also commonly used to kill dandelions, clover, and thistle. Lawn care operators applied over a million pounds of clopyralid in 2013.[1]

Clopyralid works like a plant growth regulator by mimicking auxins, natural plant hormones. Clopyralid enters treated vegetation through the leaves and roots, and replaces natural auxins at binding sites, causing abnormal growth patterns and disrupting the growth

[1] EPA, 2020. Clopyralid Proposed Interim Registration Review Decision Case Number 7212.

processes of the plant. The chemical accumulates in the growing points of the plant, leading to rapid growth, and eventually plant death. Death usually comes within a few days or weeks.

Commercial products containing clopyralid contain either the acid form, or one of its three salts—triethylamine, triisopropylamine, or monoethanolamine salts. It is also compatible, and often formulated, with other synthetic growth regulators such as 2,4-D, triclopyr, and MCPA for a broader spectrum of post-emergent control. Clopyralid is similar to the related herbicide picloram.

EPA's review is incomplete and cannot support reregistration

As EPA admits, it has not evaluated risks to threatened and endangered species. Nor has it completed endocrine disruption evaluation. Since both of these are very sensitive consequences—that may result from much lower exposures than those evaluated thus far—reregistration must not proceed until those evaluations—including consultation with U.S. Fish and Wildlife Service and National Marine Fisheries Service—are complete.

Health risks

Although the PID downplays them, clopyralid does present human health risks. Clopyralid is classified by EPA in acute toxicity class III as slightly toxic. Laboratory studies have shown that clopyralid is a severe eye irritant[2,3,4] and dermal irritation has also been noted which can lead to skin sensitization for prolonged skin exposures.[5] Some developmental and reproductive effects have been observed in laboratory animals. The livers and kidneys of rats as well as the livers of dogs were affected by changes in weight and decreased red blood cell counts.[6] Another study found that weights of rabbit fetuses decreased at both low and high doses of clopyralid. Skeletal abnormalities were also observed in these fetuses at all doses.[7]

In 2011, 47 students from Edgewood Middle School in St. Clair Township, Ohio, reportedly fell ill after the school's hired pest control company sprayed the herbicide Momentum, which contains the toxic ingredients 2,4-D, triclopyr and clopyralid, on nearby playing fields to treat for clover and other weeds. Six students were taken to nearby hospitals and twenty-one students total were treated for symptoms, including headaches, breathing difficulties, nausea, and dizziness. [8]

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[2] Cox, C. 1998. Clopyralid -Herbicide Fact Sheet. Journal of Pesticide Reform. 18(4).
[3] OSU Extension Service. 2002.Clopyralid-Pesticide Fact Sheet: Forestry Use.
[4] Tu, M., et al. 2001. CLOPYRALID. Weed Control Methods Handbook. The Nature Conservancy.
[5] Cox, C. 1998.
[6] *Ibid.*
[7] *Ibid.*
[8] https://beyondpesticides.org/dailynewsblog/2011/10/students-poisoned-by-pesticides-sprayed-on-playing-field-outside-of-classroom/.

Contaminants and "inert" ingredients

Technical grade clopyralid is contaminated with two chlorinated benzenes—2.5 ppm or less of hexachlorobenzene (HCB) and 0.3 ppm or less of pentachlorobenzene. Hexachlorobenzene is ranked as a B2 (probable) carcinogen by U.S. EPA.[9,10]

Like most pesticide products, clopyralid products contain so-called "inert" ingredients. These are ingredients added to the pesticide product to make it more potent or easier to use. Only limited information about their identities is publicly available. The following "inert" ingredients have been identified in clopyralid-containing products:

Curtail M, a clopyralid and MCPA product, contains cyclohexanone.[11] It causes eye irritation, tearing, and burning pain. It also causes skin irritation, nausea, vomiting, and diarrhea. It may cause liver and kidney damage, headache, dizziness, drowsiness, and nausea. Inhalation of cyclohexanone may be fatal as a result of spasms, inflammation, and fluid accumulation in the lungs.[12,13]

Curtail, a clopyralid and 2,4-D product, contains triisopropanolamine.[14] It causes eye irritation, and may cause skin irritation. Inhalation of triisopropanolamine may irritate the respiratory tract, and may be fatal as a result of spasms, inflammation, and fluid accumulation in the lungs.[15]

Confront, Confront Weedstick, Confront F, and two Confront-fertilizer (with clopyralid and triclopyr), combinations contain triethylamine (N,Ndiethylanamine), ethylenediaminetetraacetic acid (EDTA), and polyethoxylated tallowamine (POEA).[16]

Triethylamine causes severe eye irritation, and may cause "blue haze" vision. It also causes skin irritation, and respiratory tract irritation which may lead to chemical pneumonia. It may irritate the digestive tract.[17]

EDTA causes eye irritation, skin irritation, and respiratory tract irritation. In laboratory tests it has caused reproductive problems, including stunting and death of fetuses and

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[9] USFS. 2004. Clopyralid Human Health and Ecological Risk Assessment Final Report. 2004. Prepared for the US Forest Service by Syracuse Environmental Research Associates, Inc. Report No. SERA TR 04-43-17-03c. December 4, 2004. http://www.fs.fed.us/foresthealth/pesticide/risk.shtm.

[10] ATSDR, 2002. Toxicological Profile for Hexachlorobenzene. Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention. Atlanta GA. http://www.atsdr.cdc.gov/toxprofiles/tp90.html.

[11] C. Cox, 1998.

[12] https://fscimage.fishersci.com/msds/05890.htm.

[13] Gupta, P.K., Lawrence, W.H., Turner, J.E. and Autian, J., 1979. Toxicological aspects of cyclohexanone. *Toxicology and applied pharmacology*, *49*(3), pp.525-533.

[14] C. Cox, 1998.

[15] http://www.molbase.com/en/msds_122-20-3-moldata-267008.html.

[16] U.S. EPA. Office of Prevention, Pesticides and Toxic Substances. 1997. Letter from C.B. Furlow, Office of Pesticide Programs Public Information and Records Integrity Branch to Karen Juul, NCAP, Jun. 13.

[17] https://www.epa.gov/sites/production/files/2016-09/documents/triethylamine.pdf.

abnormal fetal development.[18] It is cytotoxic and weakly genotoxic, but not carcinogenic. Oral exposure to EDTA produced adverse reproductive and developmental effects. EDTA is likely to affect the passage of other chemicals into the skin because chelates calcium.[19]

POEA causes eye burns; skin redness, swelling, and blistering; nausea; and diarrhea.[20,21] Concentrations of POEA between 1 and 3 parts per million kill fish.[22]

Persistence and movement in the environment

Clopyralid is persistent in soil, with a recorded half-life of 2-14 months[23] and is degraded primarily by microbial activity. However, it does not readily bind to soil and is highly soluble in water. As a result, it is very mobile in soil and has the potential to move towards groundwater and contaminate surface water. Clopyralid has even been found in soil water samples taken at depths of 6 feet, up to 30 days after initial surface treatment.[24,25] Since microbial activity decreases with depth, clopyralid has the potential to persist longer at lower soil depths. Persistence of clopyralid in vegetation is evidenced by the contamination of composts from harvested lawn and grass clipping sprayed with clopyralid. Clopyralid has been detected in vegetation 365 days after initial treatments of 0.1 to 1.4 mg/kg.[26]

Environmental/property damage

Clopyralid is notorious for causing damage to nontarget plants. The registration was modified in 2002 to delete residential turf uses from the clopyralid product label. Additionally, under the amended label professional applicators are required to notify property managers not to compost clippings from treated grass. Clopyralid products continue to be used on golf courses and certain other forms of nonresidential turf, including farm, ranch, and forestry uses. EPA proposes to expand the prohibition to include school turf.[27]

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[18] https://fscimage.fishersci.com/msds/09570.htm.

[19] Lanigan, R.S. and Yamarik, T.A., 2002. Final report on the safety assessment of EDTA, calcium disodium EDTA, diammonium EDTA, dipotassium EDTA, disodium EDTA, TEA-EDTA, tetrasodium EDTA, tripotassium EDTA, trisodium EDTA, HEDTA, and trisodium HEDTA. *International journal of toxicology*, *21*, p.95.

[20] https://ethox.com/wp-content/uploads/2015/09/TAM-2-SDS.pdf.

[21] Mesnage, R., Bernay, B. and Séralini, G.E., 2013. Ethoxylated adjuvants of glyphosate-based herbicides are active principles of human cell toxicity. *Toxicology*, *313*(2-3), pp.122-128. https://www.gmoseralini.org/wp-content/uploads/2013/02/Mesnageal.TOX_2012.pdf.

[22] Haller, W.T. and Stocker, R.K., 2003. Toxicity of 19 adjuvants to juvenile Lepomis macrochirus (bluegill sunfish). *Environmental Toxicology and Chemistry: An International Journal*, *22*(3), pp.615-619. https://nctc.fws.gov/resources/course-resources/pesticides/Aquatic%20Effects/Toxicity%20of%20Adjuvants%20to%20Bluegill.pdf.

[23] Washington State University Cooperative Extension, *Clopyralid Herbicide and Compost.* Agriculture and Natural Resources Fact Sheet #538.

[24] Cox, C. 1998.

[25] Washington State University Cooperative Extension.

[26] Miltner, E., Bary, A., Cogger, C., *Clopyralid and Compost: Formulation and Mowing Effects on Herbicide Content of Grass Clippings.* Compost Science & Utilization, 2003. **11**(4): p. 289-299.

[27] EPA, 2020. Clopyralid Proposed Interim Registration Review Decision Case Number 7212.

The following sections provide background on clopyralid and the environmental and property damage it can cause as a result of drift, runoff, use of treated plant material (such as straw or grass clippings) for mulch or compost, contaminated irrigation water, and urine or manure from animals consuming treated vegetation.

Spray drift

Clopyralid is "considered volatile,"[28] according to EPA, meaning that it can evaporate from foliage and soil after application, move away from the application site, and "adversely affect nontarget broadleaf plants."[29] EPA calculated that volatilization of only one percent of applied clopyralid would be enough to damage nontarget plants.[30] For a sensitive crop plant, the amount causing damage is even smaller. Potato plants showed damage after exposure to 0.07 percent of typical agricultural rates, and 0.7 percent reduced potato yields.[31] Potatoes are so sensitive to clopyralid that effects can be seen in plants the year following exposure. When tubers from clopyralid-damaged plants were grown in an unsprayed field, clopyralid injuries were visible in the new generation of potato plants.[32]

EPA proposes to make label changes to reduce drift, without any evidence that such label changes will be effective, especially in view of the poor enforcement of product labels.[33]

Compost and mulch

Clopyralid can cause damage to sensitive plants at levels of 10 parts per billion. It is not broken down in composting facilities, and composters are very concerned about carry-over of clopyralid and other persistent herbicides, such as aminopyralid, aminocyclopyrachlor, and picloram into compostable materials. Clopyralid can enter the composting facility through lawn clippings, hay, straw, crop residues, and manure. Compost facilities now test for residues of persistent herbicides, but such tests are time-intensive and expensive.[34] EPA must ensure through the registration process that the responsibility and cost associated with resulting damage from clopyralid should not be borne by those whose products are contaminated.

In 2002, after tracing phytotoxic compost to clopyralid, Washington State banned use on lawns and turf to keep the chemical from contaminating compost supplies.[35] That same

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[28] U.S. EPA. 1990. EEB review: 90-WA-04. Washington, D.C., Mar. 7.
[29] *Ibid.*
[30] *Ibid.*
[31] Lucas, W.J. and P.G. Lobb. 1987. Response of potatoes, tomatoes, and kumaras to foliar applications of MCPA, MCPB, 2,4-D, clopyralid, and amitrole. Proc. 40th N.Z. Weed and Pest Control Conf. Pp. 59-63.
[32] Wall, D.A. 1994. Potato (Solanum tuberosum) response to simulated drift of dicamba, clopyralid, and tribenuron. Weed Sci. 42:110-114.
[33] EPA Office of Inspector General, 2020. EPA's Compliance Monitoring Activities, Enforcement Actions, and Enforcement Results Generally Declined from Fiscal Years 2006 Through 2018. https://www.epa.gov/office-inspector-general/report-epa-can-better-reduce-risks-illegal-pesticides-effectively.
[34] https://www.compostingcouncil.org/page/persistent-herbicides-faq.
[35] Washington State Department of Agriculture, 2002. Clopyralid in Compost Facts: Herbicide contamination raises problems for compost.

year, California found that 65% of the composts samples tested positive for clopyralid, which led to the cancellation of residential uses for clopyralid in the state.[36] Other states, including Ohio, New Jersey, and Pennsylvania, all reported compost contamination problems.[37]

In November 2002, the registration of clopyralid for use on residential lawns was voluntarily cancelled by the registrant, Dow AgroSciences.[38] However, compost feedstocks are contaminated by other uses that are still allowed.[39] Uses that are still allowed include: use by lawn care operators on golf courses and industrial sites; use on hay and other livestock feed crops, grain crops, certain other food crops, wildlife habitat, tree plantings, rights of way, and other non-crop sites.[40,41] Residues from any of these uses may find their way to composting facilities. Grass clippings, hay, and straw may also be used as mulch, allowing direct transfer of the herbicide to susceptible plants.

The contaminated mulch and compost may be used by homeowners, landscapers, or organic farmers. In the case of homeowners, it can mean the loss of expensive plantings. In the case of organic farmers, it can mean the loss of a crop and possibly the loss of organic certification.

Transfer of active residues through urine and manure of livestock and wildlife.

Clopyralid is not metabolized by animals, but passes through in urine and feces.[42] Thus, farmers and composters are advised to avoid manure from animals that may have eaten hay or feed that may be contaminated with it or other persistent herbicides. EPA proposes the following label amendments:

- Do not use, or allow to be used, treated plant material or manure from animals that have grazed or consumed forage from treated areas for compost, mulch, or mushroom spawn.
- Manure from animals that have grazed or eaten forage or hay harvested from clopyralid-treated areas within the previous three days may only be applied to the fields where the following crops will be grown: pasture grasses, grass grown for seed, wheat and corn.
- Animals that have been fed clopyralid treated forage must be fed forage free of clopyralid for at least 3 days before they are moved off the treated property.

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[36] de la Fuente, M., Clopyralid and Compost in California. University of California Cooperative Extension.
[37] Michel, J., et al., 2003. Clopyralid and Other Pesticides in Composts. Ohio State University Extension Factsheet.
[38] EPA, 2020. Clopyralid Proposed Interim Registration Review Decision Case Number 7212.
[39] https://cdn.ymaws.com/www.compostingcouncil.org/resource/resmgr/images/USCC-PH-Fact-Sheet-2-for-web.pdf.
[40] Stinger label: https://s3-us-west-1.amazonaws.com/agrian-cg-fs1-production/pdfs/Stinger_Label1i.pdf.
[41] Alligare label: https://alligare.com/wp-content/uploads/2018/03/clopyralid_3_label.pdf.
[42] https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/VTTP/VTTP-6/VTTP-6.pdf.

If these label restrictions are followed,[43] they may minimize the spread of clopyralid residues into sensitive areas. Doing so, however, reduces the availability of organic nutrients for crops and compost makers, thus burdening organic farmers and composters. This places undue burdens on those who do not benefit from the use of the herbicide and makes agriculture less sustainable. Instead, registrations of clopyralid and other persistent herbicides should be cancelled.

Furthermore, clopyralid use is allowed in wildlife areas, and wildlife consuming vegetation on the site can cause damage to plants off-site. As EPA admits, it has not evaluated risks to threatened and endangered species and thus cannot predict whether herbicide deposited by herbivores off-site will harm threatened and endangered species.

Risks of loss of habitat and food for insects must be considered.

All herbicides, especially those targeting broadleaved plants, pose the risk of removing plants that provide food and habitat for pollinators. Some of those pollinators may be threatened or endangered species. As EPA admits, it has not evaluated risks to threatened and endangered species and thus cannot predict whether clopyralid will harm threatened and endangered species by destroying food and habitat.

The risks of clopyralid are unreasonable in view of nontoxic alternatives.

Resistance to herbicides is an expected consequence of their use, so any perceived benefit of using an herbicide must be discounted by its reduced lifespan as an effective weed control. There are currently 514 unique cases (combinations of species and site of action) of herbicide resistant weeds globally, with 262 species (152 dicots and 110 monocots). Weeds have evolved resistance to 23 of the 26 known herbicide sites of action and to 167 different herbicides. Herbicide resistant weeds have been reported in 93 crops in 70 countries.[44] Resistance to clopyralid in yellow starthistle was documented in 1990,[45] and knowledge of resistance to the synthetic auxin herbicide family dates to 1957.[46] The International Herbicide-Resistant Weed Database lists lawn burweed (*Soliva sessilis*), common lambsquarters (*Chenopodium album*), and spotted knapweed (*Centaurea stoebe ssp. micranthos*) as resistant to clopyralid. Tall waterhemp (*Amaranthus tuberculatus (=A. rudis)*) is resistant to aminopyralid

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[43] Absent improved enforcement, EPA cannot count on labels to reduce risk. EPA Office of Inspector General, 2020. EPA's Compliance Monitoring Activities, Enforcement Actions, and Enforcement Results Generally Declined from Fiscal Years 2006 Through 2018. https://www.epa.gov/office-inspector-general/report-epa-can-better-reduce-risks-illegal-pesticides-effectively.

[44] http://weedscience.org/Pages/Herbicide.aspx.

[45] Sabba, R.P., Ray, I.M., Lownds, N. and Sterling, T.M., 2003. Inheritance of resistance to clopyralid and picloram in yellow starthistle (Centaurea solstitialis L.) is controlled by a single nuclear recessive gene. *Journal of Heredity*, *94*(6), pp.523-527.

[46] Busi, R., Goggin, D.E., Heap, I.M., Horak, M.J., Jugulam, M., Masters, R.A., Napier, R.M., Riar, D.S., Satchivi, N.M., Torra, J. and Westra, P., 2018. Weed resistance to synthetic auxin herbicides. *Pest management science*, *74*(10), pp.2265-2276.

and may also be resistant to other synthetic auxins. Wild mustard (*Sinapis arvensis*) is resistant to picloram and may also be resistant to other synthetic auxins.[47]

The growth of organic agriculture demonstrates the viability of nontoxic alternatives in agriculture.[48,49] Nonorganic producers are looking to organic practices for help in dealing with the problem of herbicide resistance.[50] In turf systems, managers are increasingly successful using organic systems, often mandated by local ordinances.[51,52]

Conclusion

The use of clopyralid poses unreasonable risks to human health, property, and the environment that are borne mostly by those who do not receive any benefit from the use of the herbicide. The risks are not outweighed by benefits, so the registration of clopyralid should be cancelled.

Thank you for your consideration of these comments.

Sincerely,

Terry Shistar, Ph.D.
Board of Directors

[4747] http://weedscience.org/Pages/ResistByActive.aspx.

[48] https://ota.com/resources/market-analysis.

[49] https://rodaleinstitute.org/blog/weed-management-the-organic-way/.

[50] McErlich, A.F. and Boydston, R.A., 2014. Current state of weed management in organic and conventional cropping systems. In *Automation: The Future of Weed Control in Cropping Systems* (pp. 11-32). Springer, Dordrecht.

[51] See, for example, https://www-static.bouldercolorado.gov/docs/City_of_Boulder_Organic_Lawn_Care_Guide-1-202006102338.pdf?_ga=2.238926409.837345264.1591624729-594104085.1575431345.

[52] Beyond Pesticides Map of Pesticide Reform Policies. 2016. https://www.google.com/maps/d/viewer?mid=1VLpVWvifO2JOrgxf1-d1DLyDruE&ll=39.03573413957711%2C-94.19459570507814&z=5.