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Statement of Beyond Pesticides in Support of AB162
Nevada Assembly Committee on Natural Resources
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Thank you to Chairs Cohen and Anderson, and the rest of the Nevada Assembly Committee on Natural Resources for the opportunity to provide comment in support of AB162, as amended.

Beyond Pesticides is a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to improve protections from pesticides and promote alternative pest management strategies that reduce or eliminate a reliance on toxic pesticides. Our membership spans the 50 states, the District of Columbia, and groups around the world. We are providing this testimony on behalf of our members and supporters in the state of Nevada.

We urge the Committee on Natural Resources to pass AB162, as amended, legislation that is supported by a large body of peer-reviewed scientific findings.[1]

We appreciate the committee's work identifying the need to improve state safeguards concerning neonicotinoids, hazardous insecticides that harm pollinators, birds, wildlife, and human health, as well as contaminate surface and drinking water. AB162 represents important step towards filling in the gaps in protection left by the U.S. Environmental Protection Agency (EPA) in a way that best ensures resident safety and ecological stability in the state.

The science on the dangers neonicotinoids pose to pollinators and other wildlife is clear, yet federal agencies have not acted substantively. The only changes made by the agency have been limited to the neonicotinoid product label, regarding application timing and amounts. As you know, because neonicotinoids are systemic pesticides, the chemical moves through the vascular system of the plant and is expressed through the plants pollen, nectar, and guttation droplets, causing indiscriminate poisoning to foraging pollinators. The chemical effectively turns the plant into a delivery vehicle for poisons.

Beyond Pesticides urges the Environment Committee to not only consider this AB162 as amended, but further amendments that eliminate all outdoor uses of neonicotinoids, including its agricultural applications. The European Union, after suspending use of neonicotinoids on outdoor flowering plants for several years, made the decision to eliminate all outdoor

[1] Beyond Pesticides. 2023. What the Science Shows Pollinator Database.
https://www.beyondpesticides.org/programs/bee-protective-pollinators-and-pesticides/what-the-science-shows

neonicotinoid uses except those in contained greenhouses.[2] The EU's decision is an acknowledgement that there is no safe level of neonicotinoid exposure for foraging bees, butterflies, and other pollinators.

Pollinators are faring poorly in Nevada, throughout the United States, and around the world. As DDT was the primary factor behind declines in birds of prey, neonicotinoid insecticides are the key component to address in the ongoing decline of pollinator populations, especially in light of habitat loss. Reports consistently show managed pollinator losses over an unsustainable 30% (an astounding 53% for 2019-2020 total annual loss in NV),[3] and the die off of wild pollinators impacting agricultural production.[4]

The peer-reviewed research shows that neonics are taken up by flowering plants at levels that can harm pollinators on both an acute and chronic, long term basis.[5] These chemicals have been shown, even at low levels, to impair foraging, navigation, and learning behavior in bees, as well as suppress their immune system, increasing susceptibility to pathogens and disease.[6] Research finds neonics can alter feeding behaviors and reduce egg development in bumblebee queens,[7] inhibit pollination skills among bumblebee workers,[8] and reduce overall colony size.[9]

The crisis is not limited to pollinators. Beneficial soil dwelling insects, benthic aquatic insects, grain-eating vertebrates like songbirds, and even mammals, such as deer, are also at risk from neonicotinoids. Research finds that neonicotinoid concentrations detected in aquatic environments pose risks to aquatic invertebrates and the ecosystems they support.[10] Two studies published in 2020 together find that neonicotinoids adversely effects shrimp and oyster health, decreasing their nutritional value. "These two studies indicate both crustaceans and mollusks are vulnerable to insecticides, weakening their immune system and leaving them susceptible to disease," said co-author Kirsten Benkendorff, PhD.[11]

There is evidence of adverse effects moving up the food chain. One study demonstrates that a

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[2] European Commission. 2022. Current Status of Neonicotinoids in the EU. https://ec.europa.eu/food/plants/pesticides/approval-active-substances/renewal-approval/neonicotinoids_en#current-status-of-the-neonicotinoids-in-the-eu.

[3] Bee Informed Partnership. 2020. Colony Loss Map. https://research.beeinformed.org/loss-map/

[4] Reilley et al. 2020. Crop production in the USA is frequently limited by a lack of pollinators. Proceedings of the Royal Society. B. https://royalsocietypublishing.org/doi/10.1098/rspb.2020.0922#d1e951.

[5] Mogren C and Lundgren J. 2016. Neonicotinoid-contaminated pollinator strips adjacent to cropland reduce honey bee nutritional status. Scientific Reports 6, Article number: 29608 http://www.nature.com/articles/srep29608.

[6] Harriott, N. 2014. Bees, Birds and Beneficials: How fields of poison adversely affect non-target organisms. *Pesticides and You*. Vol. 33, No. 4 Winter 2013-14. http://www.beyondpesticides.org/assets/media/documents/infoservices/pesticidesandyou/documents/BeesBirdsBeneficials.pdf.

[7] Baron et al. 2017. General and species-specific impacts of a neonicotinoid insecticide on the ovary development and feeding of wild bumblebee queens. Proceeding of the Royal Society B. https://doi.org/10.1098/rspb.2017.0123.

[8] Switzer and Combes. 2016. The neonicotinoid pesticide, imidacloprid, affects Bombus impatiens (bumblebee) sonication behavior when consumed at doses below the LD50. Ecotoxicology. 2016 Aug;25(6):1150-9. doi: 10.1007/s10646-016-1669-z. Epub 2016 May 17.

[9] Arce et al. 2016. Impact of controlled neonicotinoid exposure on bumblebees in a realistic field setting. Journal of Applied Ecology. https://doi.org/10.1111/1365-2664.12792.

[10] Morrissey, C. et al. 2015. Neonicotinoid contamination of global surface waters and associated risk to aquatic invertebrates: A review. *Environment International*. doi:10.1016/j.envint.2014.10.024.

[11] Butcherine et al. 2020.. Impact of imidacloprid on the nutritional quality of adult black tiger shrimp (Penaeus monodon). Ecotoxicology and Environmental Safety 198: 110682. https://doi.org/10.1016/j.ecoenv.2020.110682 ; Ewere et al. 2020 The neonicotinoid insecticide imidacloprid, but not salinity, impacts the immune system of Sydney rock oyster, Saccostrea glomerata. Science of the Total Environment 742: 140538. https://doi.org/10.1016/j.scitotenv.2020.140538.

single corn kernel coated with a neonicotinoid is toxic enough to kill a songbird.[12] Research published in the esteemed journal *Science* found songbirds that feed on neonicotinoid-contaminated seeds during their migration route display reduced weight, delayed travel, and low rates of survival. The author of that study, ecotoxicologist Chrissy Morrisey, PhD, said, "Our study shows that this is bigger than the bees — birds can also be harmed by modern neonicotinoid pesticides which should worry us all."[13] Data from the Netherlands has showed that the most severe bird population declines occurred in those areas where neonicotinoid pollution was highest,[14] alarming in the context of a recent *Science* study finding 3 billion birds (30% total) lost since 1970 in part due to pesticide use.[15]

Neonicotinoids have been shown to harm mammals like deer. A two-year study published in *Nature Scientific Reports* finds that field-relevant contamination with the neonicotinoid insecticide imidacloprid causes reduced body weight and metabolism in white-tailed deer, and in fawns, birth defects and mortality. Remarkably, researchers uncovered imidacloprid levels in free-ranging deer a full 3.5 times higher, on average, than the levels in the animals treated in their experiment.[16] Ubiquitous contamination of deer was confirmed through a follow-up study by the Minnesota Department of Natural Resources, which found that out of 800 deer spleens analyzed, 61% of samples contained neonicotinoids.[17]

Emerging evidence is showing that contrary to pesticide industry claims, neonicotinoids present both direct and indirect harms to human health. Recent research shows that neonicotinoids can act as endocrine (hormone) disruptors at very low doses, resulting in damage that can lead to hormone-dependent breast cancer.[18] Neonicotinoids have been found to readily transfer from mother to fetus through the placenta, presenting higher risks of birth defects.[19] A major review of the risks neonicotinoids posed to humans highlights the potential for neurological impacts, such as memory loss and finger tremor.[20]

Additionally, independent research recently highlighted a human health hazard EPA had the potential to explore yet ignored: liver damage. A study in the *Journal of Hazardous Materials* found that the widely used neonicotinoid dinotefuran barely metabolizes at all in the body yet is absorbed

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[12] Mineau P, Whiteside M. 2013. Pesticide Acute Toxicity Is a Better Correlate of U.S. Grassland Bird Declines than Agricultural Intensification. PLoS ONE 8(2): e57457.

[13] Bienkowski, Brian. 2019. Common insecticide threatens survival of wild, migrating birds. EHN. https://www.ehn.org/common-insecticide-threatens-survival-of-wild-migrating-birds-2640322064.html.

[14] Hallmann CA, et al. 2014. Declines in insectivorous birds are associated with high neonicotinoid concentrations. *Nature* doi:10.1038/nature13531.

[15] Rosenberg et al. 2019. Decline of North American avifauna. Science.https://science.sciencemag.org/lookup/doi/10.1126/science .aaw1313.

[16] Hughes Berheim et al. 2019. Effects of Neonicotinoid Insecticides on Physiology and Reproductive Characteristics of Captive Female and Fawn White-tiled Deer. Scientific Reports volume 9, Article number: 4534 https://www.nature.com/articles/s41598-019-40994-9#Tab4

[17] Kennedy, Tony.2021. DNR says it will look harder at insecticides' effect on Minnesota deer. Star-Tribune. https://www.startribune.com/dnr-says-it-will-look-harder-at-insecticides-effect-on-minnesota-deer/600030437/?refresh=true.

[18] Beaudoin et al. 2018. Effects of Neonicotinoid Pesticides on Promoter-Specific Aromatase (CYP19) Expression in Hs578t Breast Cancer Cells and the Role of the VEGF Pathway. Environmental Health Perspectives. https://ehp.niehs.nih.gov/doi/full/10.1289/EHP2698?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed.

[19] Zhang et al. 2022. Neonicotinoid Insecticides and Their Metabolites Can Pass through the Human Placenta Unimpeded. Environmental Science and Technology. https://pubs.acs.org/doi/full/10.1021/acs.est.2c06091.

[20] Cimino et al. 2017. Effects of Neonicotinoid Pesticide Exposure on Human Health: A Systematic Review. https://ehp.niehs.nih.gov/doi/10.1289/EHP515

by the liver and shows up in liver bile, posing a risk to liver health.[21] EPA registration documents for dinotefuran explain that tests found neonicotinoids to absorb to the liver. The document notes, "The test material was essentially not metabolized, the parent compound accounting for >97% of the radiolabel in the excreta, plasma, kidneys, and stomach, and nearly 61-83% in intestines (and contents), and liver."[22] EPA did nothing with that data. No further testing was conducted to understand or characterize the hepatotoxic (injurious to liver) nature of the insecticide, and it does not appear as though the results influenced any changes in the agency's determination on use patterns. In other words, EPA has enough data to investigate this issue and make even minor protective changes. Instead, after decades of this chemical being on the market, it has taken an independent, peer-reviewed study to extrapolate and further investigate the critical details of how a near complete lack of dinotefuran adsorption in the body affects the liver.

Beyond direct damage, the loss of pollinators from neonicotinoid pesticides is resulting in significant indirect damage to vulnerable, economically distressed individuals in our society. A recent study published in *Environmental Health Perspectives* on the connection between the loss of pollinators and human health finds that pollinator losses are responsible for reducing the global production of nuts, fruits, and vegetables by 3-5%, and that this loss of healthy, nutrient-dense food is resulting in over 425,000 excess deaths each year. As lawmakers, you will undoubtedly find this quote alarming: *"Pollinator deficits were estimated to be responsible for 1% of total annual mortality in both upper–middle- and high-income countries."* [23]

Eliminating neonicotinoids will not cause major disruptions to the pest management or pest service industry. Pest problems in landscaped areas can be prevented through practices that improve soil health, and promote biodiversity and habitat for pest predators. If pest problems do become an issue, a wide range of insecticidal soaps and essential oils, classified either as certified organic, or minimum risk, are available and represent a least-toxic option. These chemicals still pose some level of risk to pollinators, and should not be sprayed while they are foraging, but are not chronic, systemic chemicals that continuously poison pollinators and the surrounding landscape.[19]

In most cases, the outdoor use of any pesticide is unnecessary. One study, published in *Environmental Entomology*, finds that spraying of urban trees disrupts the ability of beneficial species in the landscape to naturally manage pest populations. The authors determined that moderate pest levels both attract and maintain predators that provide critical biological control services in a landscape. "Treating a tree with pesticides could kill off natural enemies that would otherwise help manage nearby pests. In other words, treating a tree with pesticides could alleviate pest problems within the tree but could result in pest outbreaks in shrubs beneath the tree as natural enemies are killed off," said Caleb Wilson, PhD, of Michigan State University.[24]

While we support the elimination of all outdoor uses of neonicotinoids, it must be noted that these chemicals are merely the 'poster child' for broader problems associated with EPA's system of registering and evaluating pesticides. At a time of cascading and intersecting public health,

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[21] Chen et al. 2023. First evidence of neonicotinoid insecticides in human bile and associated hepatotoxicity risk. Journal of Hazardous Materials. https://www.sciencedirect.com/science/article/abs/pii/S0304389422025110.
[22] USEPA. 2017. Dinotefuran: Human Health Draft Risk Assessment for Registration Review. https://www.regulations.gov/document/EPA-HQ-OPP-2011-0920-0620.
[23] Smith et al. 2022. Pollinator Deficits, Food Consumption, and Consequences for Human Health: A Modeling Study. Environmental Health Perspectives. https://ehp.niehs.nih.gov/doi/full/10.1289/EHP10947#c62
[24] Wilson and Frank. 2022. Scale Insects Support Natural Enemies in Both Landscape Trees and Shrubs Below Them. Environmental Entomology. https://academic.oup.com/ee/article/51/6/1094/6763314?login=false.

biodiversity, and climate crises, yes we must ban chemical classes causing immense harm; yet we must also move towards an approach that incentivizes sustainable practices that do not necessitate these chemicals in the first place. We would be happy to work with the committee to achieve these broader health and sustainability goals.

Nevada has the opportunity to reverse pollinator declines caused by neonicotinoid insecticides, while concurrently increasing protections for public health and the wider environment. We urge passage of AB162, as amended and consideration of further pesticide reform policies that will prevent the allowance of damaging pesticides in the first place.

Thank you for the opportunity to comment.

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