What is Indaziflam?

Indaziflam, sold under the brand name "Rejuvra", is a pre-emergent herbicide used to control invasive annual grasses, most notably cheatgrass (*Bromus tectorum*), on rangelands.[1] Developed by Bayer and now promoted widely across the American West, it is being considered for large-scale application across millions of acres of Bureau of Land Management and U.S. Forest Service public lands. The chemical works by preventing seed germination and is touted as having a long-lasting residual effect — persisting in soil for up to three years. While its use is intended to improve rangeland health and reduce wildfire risk by suppressing cheatgrass, a growing body of scientific evidence suggests that Indaziflam poses serious risks to human health, soil ecosystems, native biodiversity, and wildlife forage resources.

The widespread use of Indaziflam on public lands poses **substantial and underacknowledged risks** to human health, soil health, native biodiversity, wildlife, aquatic ecosystems — and now, potentially, through per-and polyfluoroalkyl substance (PFAS) contamination.

1. Human Health Risks

Although Indaziflam has been marketed as having low acute toxicity, emerging research suggests significant **genotoxic effects on human cells**, meaning it can damage DNA.[2] This concern is amplified by proposals to apply the herbicide over vast expanses of public land, including areas near **tribal lands, rural towns, and recreation sites**. Widespread exposure to a chemical with DNA-damaging potential — even at low concentrations — warrants much closer scrutiny and precautionary oversight, particularly when applied aerially or via ground broadcast across inhabited landscapes.

2. Disruption of Soil Microbiota

Recent studies show that Indaziflam is a **potent amebicide**, meaning it kills amoebae — key protozoa in soil ecosystems.[3,4] Amoebae are among the most abundant microbial predators in healthy soils, playing vital roles in nutrient cycling and promoting plant growth.[5] By reducing these essential microbes, Indaziflam may inadvertently foster conditions that favor **soil-borne pathogens**, reduce plant nutrient uptake, plant growth, and impair soil resilience.

3. Harm to Native Annual Plants

Indaziflam is a **non-selective herbicide** that kills not only invasive grasses but also many **native annual forbs and grasses**— plants that are crucial to ecological recovery, pollinator support, and wildlife forage.[6] Scientific research shows that some native annuals, such as **fiddleneck, ragweed, and western tansy mustard,** are effective natural competitors to cheatgrass, significantly reducing its seed production and biomass.[7,8] Unfortunately, these beneficial plants are also eliminated by Indaziflam.

1. EPA Office of Pesticide Programs. Rejuvra Herbicide Label (EPA Reg. No 432-1613). Herbicide Branch, Registration Division. **2.** Adiguze, S.K.,*The possible cytotoxicity and genotoxicity assessment of indaziflam on HepG2 cells.* Human and Experimental Toxicology, 2023. 42: p. 1-8. **3.** Mungroo, M.R., et al., *Development of anti-acanthamoebic approaches.* International Microbiology, 2021. 24: p. 363-371. **4.** Siddiqui, R., et al., *Antiamoebic Properties of Laboratory and Clinically Used Drugs against Naegleria fowleri and Balamuthia mandrillaris.* Antibiotics, 2022. 11. **5.** Wang, Z., et al., *The neonicotinoid insecticide imidacloprid has unexpected effects on the growth and development of soil amoebae.* Science of the Total Environment, 2023. Vol. 869. **6.** Meyer-Morey, J., et al., *Indaziflam controls nonnative Alyssum spp. but negatively affects native forbs in sagebrush steppe.* Invasive Plant Science Management, 2021. 14: p. 253-261. **7.** Tilley, D., et al., *When a weed is not a weed: succession management using early seral natives for Intermountain rangeland restoration.* Rangelands, 2022. 44: p. 270-280. **8.** Stube, C.J.K., *Interactions between Bromus tectorum L. (cheatgrass) and native ruderal species in ecological restoration.* Dissertation at Colorado State University, 2012.

The herbicide's long persistence in soil can delay or block the natural process of **plant succession,** creating bare ground prone to erosion and secondary invasions. A Boulder County sponsored study found **75% lower native species richness** in sprayed areas compared to untreated zones, even a year after wildfire.[9] Notably, the **spray favored non-native perennial grasses** while reducing native diversity — the opposite of its intended effect.[10]

4. Impact on Wildlife Forage

While cheatgrass is invasive, it also serves as a **key forage resource** for both domestic livestock and native wildlife like elk, pronghorn, and bighorn sheep, especially in late winter and early spring. Historical and modern data confirm its importance for early-season grazing.

Removing cheatgrass without providing alternative forage can create a **forage gap** in critical seasons. Eradicating it without replacing its function could lead to nutritional stress for wildlife, particularly in peripheral and degraded habitats.

5. Risk to Aquatic Ecosystems

Rejuvra's product label warns that it has a **high potential to contaminate surface waters** via runoff, and states that it is **toxic to fish, aquatic invertebrates, and aquatic plants**. Despite instructions not to apply it near water bodies, the scale of proposed use across public lands — many of which include streams, wetlands, and riparian corridors — raises serious concerns about contamination during storm events.

Many of the aquatic species at risk are targets of federal and nonprofit conservation efforts, making this chemical's runoff risks particularly troubling.

6. Spread of Harmful Chemicals

A growing concern in pesticide regulation is the presence of **PFAS — also known as "forever chemicals"** — which are persistent, toxic, and can accumulate in human and animal tissues.[12]

- **Inert ingredients:** Up to 80% of Rejuvra's formulation consists of undisclosed inert ingredients;
- **Independent Testing:** Lab analysis of three different Rejuvra products (2 different lots) found PFHxA (1,760 - 2,930 ppt) and PFHxS (1,000 - 2,060 ppt) in the pesticides. PFOS and PFBS were also observed in a prior analysis of the product.

Federal and state regulators should immediately suspend applications until the product undergoes a comprehensive review considering the impacts that spraying a toxic forever chemical has on human health, wildlife and the ecosystem.

Moving Forward

There are more ecologically sound approaches to managing invasive grasses like **manual or mechanical removal** in combination with reseeding can be effective on smaller, high-priority restoration sites. Protecting biocrust by **resting grazing allotments and reducing livestock** can prevent the spread of cheatgrass which dominates in bare, open soil.[14] **Restoration planting** with native annual forbs and early successional plants can help re-establish competitive plant communities that naturally suppress cheatgrass over time.

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9. Alba, C. and M. DePrenger-Levin, *Incorporation of indaziflam (Rejuvra.) into Boulder County Parks and Open Space Weed Management: A Post-Fire Assessment.* Denver Botanical Gardens Project Report, 2021. **10.** Id, See Table 4, p 11. **11.** Schwartz, C.C., *Pronghorn diets relative to forage availability in Northeastern Colorado*, Journal of Wildlife Management, 1976 (40) 3: pp 469-478. **12.** Donley, Cox, Bennett, et al. *Forever pesticides: a growing source of PFAS contamination in the environment*. Environmental Health Perspectives, 2024. **13.** *PFAS in pesticide containers: Testing and monitoring update.* [https://www.epa.gov/pesticides/pfas-pesticide-containers] 2021. **14.** Molvar, E.M. et al, *Cheatgrass invasions: History, causes, consequences, and solutions.* Hailey, ID: Western Watersheds Project, 2024, 128 pp. at 40-48.