September 22, 2027

EPA-HQ-OPP-2026-3862
Innovation Challenge: Alternatives to Conventional Pesticide Chemicals for Crop Desiccation

To Whom It May Concern,

The Pollinator Stewardship Council appreciates the opportunity to comment on the Environmental Protection Agency's proposed Innovation Challenge to identify practical, cost-effective alternatives to conventional pesticide chemicals used for crop desiccation. We strongly support EPA's decision to invest in reducing reliance on conventional pesticides while maintaining agricultural productivity, crop quality, and farm viability.

PSC is a national nonprofit organization representing commercial beekeepers and others working to protect managed and native pollinators that are essential to a sustainable and affordable food supply. Our members see firsthand the consequences of an agricultural system in which pesticides have too often become routine inputs rather than tools used when demonstrated need warrants them. In our 2025 MAHA petition to the federal government, PSC and the American Beekeeping Federation documented extensive scientific evidence concerning pesticide exposure, pollinator losses, environmental contamination, and human health concerns. EPA's proposed Innovation Challenge offers an opportunity to move beyond simply documenting those problems and begin investing seriously in solutions. PSC urges EPA to make regenerative agriculture a central component of this Innovation Challenge. Reducing conventional pesticide use should not mean finding a new chemical to perform precisely the same function. The greater opportunity is to ask how farming systems themselves can be redesigned so that fewer chemical interventions are necessary in the first place.

Regenerative agriculture is not a single prescribed production method. It generally involves combinations of practices that build soil health and biological diversity, including crop rotations, cover crops, reduced soil disturbance, continuous living roots, biological pest management, diversified plant communities, livestock integration where appropriate, and reduced reliance on synthetic chemical inputs. Which practices work best will necessarily vary by crop, geography, climate, soil, and farming operation.

Some of the most compelling evidence comes from research led by Dr. Jonathan Lundgren and the Ecdysis Foundation. In a 2026 study of 210 North American field-crop farms ranging from highly conventional to highly regenerative systems, Lundgren and colleagues found substantially greater biodiversity on regenerative farms, encompassing soil microbes, invertebrates, plants, and birds. The most regenerative farms contained 39% greater total soil-carbon pools than the most conventional farms. Regenerative crop yields were comparable to national averages, while net profits were equivalent across management styles, despite higher mean yields on conventional farms. (Lundgren et al., 2026)

Long-term research from Rodale Institute's Farming Systems Trial has found that organic grain systems generally produce yields comparable to conventional systems after the transition period, while organic corn yields have averaged 31% higher during drought years—demonstrating the potential for biologically based farming systems to improve resilience under extreme weather. (Lotter et al., 2003; Hepperly et al., 2006)

Additional research provides similarly important evidence. A study of regenerative corn farms found substantially lower pest abundance and greater profitability in regenerative systems, despite lower yields. The regenerative farms relied on combinations of practices including eliminating insecticides, reducing tillage, planting multispecies cover crops, and integrating livestock. Importantly, profitability was more strongly associated with soil organic matter than with yield alone. (LaCanne & Lundgren, 2018) Research in California almond orchards shows that regenerative orchards incorporating multiple practices—including reducing or eliminating synthetic agrichemicals, maintaining perennial groundcover, integrating livestock and preserving non-crop habitat—had similar almond yields and pest damage compared with conventional orchards. However, regenerative orchards also had significantly greater soil organic matter and carbon, substantially greater biodiversity, water infiltration approximately six times faster, and roughly twice the profitability. (Fenster et al., 2021)

These studies challenge the assumption that high-input agriculture is the only pathway to economically viable food production.

Other agricultural research points in the same direction. Lechenet et al. (2017), studying 946 commercial farms, found that pesticide use could be substantially reduced on many farms without negatively affecting productivity or profitability. More recently, Leach et al. (2025) synthesized 126 studies encompassing 466 field trials across 34 crops and found that threshold-based pest management reduced insecticide applications by 44% and insecticide costs by 40%, without compromising overall crop yield or pest control. This is exactly the kind of agricultural innovation EPA should accelerate.

Reducing pesticide dependence is not merely about eliminating an environmental harm. It is also about restoring biological systems that provide agricultural services for free.

Pollinators are essential to the production of many fruits, vegetables, nuts, and seeds that comprise a healthy diet. USDA estimates that honey bee pollination alone contributes more than $18 billion in value to U.S. crop production annually. Yet pollinators are experiencing extraordinary stress. During the 2024–25 season, surveyed U.S. commercial beekeepers reported catastrophic colony losses, with more than one million colonies lost among survey respondents alone.

PSC's MAHA petition documented both the economic importance of pollination and the multiple pathways through which bees encounter pesticides in agricultural landscapes, including pollen, nectar, treated seed, soil, and surface water. A recent large-scale analysis of 681 crop fields across three continents, encompassing 910 wild bee species and 6,667 pesticide applications, found increasing pesticide hazard associated with reduced wild-bee abundance, species richness, and functional and phylogenetic diversity. Critically, surrounding semi-natural habitat did not eliminate the adverse relationship between pesticide hazard and bee communities. (Knauer et al., 2026)Protecting habitat while continuing high pesticide pressure within crop fields is therefore not an adequate conservation strategy. A recent meta-analysis of 42 studies across four continents found significantly greater pollinator species richness and abundance on organic farms than conventional farms. Bumblebees showed particularly strong responses. (Walker et al., 2025) An earlier meta-analysis of 94 studies similarly found approximately 34% greater species richness on organic farms, with pollinators among the groups showing the strongest benefits. (Tuck et al., 2014)

Organic and regenerative agriculture are not necessarily interchangeable. Nevertheless, the organic literature provides a large body of evidence demonstrating what happens when agricultural systems reduce synthetic pesticide inputs while increasing biological and management diversity.

For PSC, this is fundamental. Pollinators are not separate from food production. They are a critical part of our food system. **An agricultural system that maximizes short-term crop production while degrading pollinators, soil organisms, natural enemies of crop pests, water quality, and human health is externalizing costs that eventually return to farmers and the food system itself.**

EPA should also recognize an important limitation in the existing evidence base: compared with conventional agriculture—and even certified organic agriculture—there remains relatively little large-scale, long-term, independent research evaluating whole regenerative farming systems. That gap should not be interpreted as evidence that regenerative systems do not work. It reflects decades of agricultural research priorities that have devoted enormous resources to evaluating individual chemical products and inputs while underinvesting in understanding how diversified biological systems function as a whole. Regenerative agriculture presents particular research challenges because its effects often emerge from interactions among multiple practices, rather than from a single intervention that can easily be tested against a control.

Research in California’s almond orchards illustrates this clearly. Researchers concluded that no single regenerative practice explained the improved outcomes. Rather, the benefits emerged when multiple practices were combined into functioning agricultural systems. Ecdysis' ongoing 1000 Farms Initiative, which has now collected standardized measurements from more than 1,000 farms, is explicitly attempting to address this evidence gap by studying real farms across North America rather than isolated experimental plots.

EPA's $30 million investment could substantially advance this field.

The Agency should therefore dedicate meaningful funding not only to technologies that replace chemical desiccants, but also to independent, multi-year, farmer-centered research comparing whole farming systems. Studies should measure yield and crop quality, but they should also measure profitability, input costs, pesticide reductions, soil health, water retention, biodiversity, pollinator abundance, natural pest suppression, worker exposure, and resilience under drought and other extreme weather. Yield alone is not an adequate measure of agricultural success.

A system that produces marginally more crop per acre but requires substantially greater expenditures on pesticides, fertilizers, fuel, irrigation, and pest management may not leave the farmer better off. Likewise, a production system that generates high yields while imposing costs through polluted water, declining pollinators, degraded soil, or human chemical exposure cannot accurately be described as inexpensive simply because those costs occur somewhere else.

PSC understands the challenge in removing effective tools from farmers without providing workable alternatives. Farmers operate under enormous economic pressure. They must manage pests, unpredictable weather, narrow margins, market demands, labor shortages, debt, and increasingly volatile production conditions.

Farmers need research, demonstration farms, technical assistance, transition funding, equipment, risk-sharing mechanisms, and farmer-to-farmer education. EPA's own RFI recognizes this need by asking about technical, operational, regulatory and market barriers to adoption and whether the Innovation Challenge should support outreach programs as well as new technologies.

PSC strongly recommends that it do so.

The most promising projects should bring farmers, independent researchers, Extension professionals, conservation organizations, beekeepers, equipment developers and food-system businesses together to test alternatives under real production conditions. EPA should also prioritize projects that can demonstrate measurable reductions in conventional pesticide use, rather than merely introducing another product. Evaluation criteria should include reductions in pesticide applications and toxicity; farm profitability; crop yield and quality; soil health; water use and retention; pollinator and beneficial-insect populations; worker exposure; scalability; and farmer adoption.

We can substantially reduce pesticide dependence in many agricultural systems while maintaining productive and economically viable farms. The emerging regenerative-agriculture literature goes further, suggesting that rebuilding biological function on farms can improve soil health, biodiversity, water cycling, resilience, and in some systems profitability as well.

But the federal research investment has not yet matched the magnitude of that opportunity. PSC therefore urges EPA to use this Innovation Challenge to go beyond finding substitutes for conventional chemical desiccants, but instead to help build a fundamentally more resilient agricultural system. EPA should devote substantial resources to regenerative systems research, farmer-led demonstrations, technical assistance, and scalable approaches that reduce dependence on synthetic pesticides while measuring outcomes that matter to farmers, pollinators, people, and the environment.

We should not have to choose between feeding people and protecting the biological systems that make food production possible. The purpose of agricultural innovation should be to accomplish both.

The Pollinator Stewardship Council requests:

1. Make regenerative agriculture a dedicated funding track within the $30 million Innovation Challenge, including whole-system approaches that reduce or eliminate the need for chemical desiccation.
2. Fund multi-year, independent research and demonstration projects on commercial farms, including comparisons of regenerative, organic, IPM and conventional systems across crops and regions.
3. Measure success beyond yield, including pesticide reduction, profitability, input costs, soil health, water use, pollinator and beneficial-insect biodiversity, worker exposure and resilience.
4. Invest in farmer adoption, including Extension, farmer-to-farmer education, demonstration farms, transition assistance and equipment or infrastructure needed to make alternatives practical at commercial scale.

Thank you,

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