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HORTICULTURE TITLE: HOW THE FARM BILL WORKS FOR SPECIALTY CROP PRODUCERS
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Good morning, Chairman Fetterman, Ranking Member Braun, Chairwoman Stabenow, Ranking Member Boozman, and Members of the Subcommittee. I'm Dr. Margaret Leigh Worthington, Associate Professor of Horticulture and Director of the Fruit Breeding Program at the University of Arkansas System Division of Agriculture in Fayetteville. I'm pleased to be here today to offer testimony on the Horticulture Title of the Farm Bill, specifically as it relates to specialty crops.

I'm speaking today on behalf of the American Seed Trade Association (ASTA), which represents nearly 700 member companies involved in seed production and distribution, plant breeding, seed treatment and related industries in North America. ASTA's members include companies of all sizes and sectors, representing every crop type -- from vegetable and flower, to row crop, to environment and conservation seed – and all production types, from organic to biotech.

The U.S. has a long history and tradition of entrepreneurship, founded on successful systems of technology transfer from the public sector to the private sector. Especially true for low acreage crops, public and private partnerships are essential in deploying the strengths of both sectors to bring improved varieties to the marketplace.

THE NEED FOR INNOVATION

Modern Plant Breeding

Plant breeding dates back thousands of years to when people first domesticated wild plants. As the years have gone by, plant scientists' understanding of agriculture has continued to progress. Building on the foundational principles that have been used for generations, new and evolving plant breeding innovations are allowing us to more efficiently and sustainably address the real and pressing challenges facing food and agriculture production. The continuous advancement in the understanding of plant genomes provides new opportunities to meet these challenges in a safe and sustainable way, both today and in the future.

Universities and companies alike are utilizing gene editing tools in research projects across all plant species, for a range of needed applications benefiting farmers, consumers, and the environment – from disease resistance and drought tolerance, to added nutritional benefits, better taste, and food safety. These crops are critical to complement staple crops in providing essential nutrition and health to the U.S. population. Importantly, this research includes critical applications in small acreage, high-value specialty crops, which face unique challenges and have not previously been able to fully utilize the potential of the latest breeding tools due to the high cost and associated regulatory burdens. It is well documented that regulatory hurdles have contributed to limiting GM technology to only a few crops affordable by only multinationals, denying specialty crops an essential tool to meet global challenges (Miller et al. 2010). Unfortunately, investment in gene editing tools and trait targets in the specialty crop sector is similarly limited, due to uncertain regulatory outcomes in the U.S. and global inconsistency of regulatory policy.

I direct active cultivar development programs in blackberries, peaches, grapes, and muscadine grapes at the University of Arkansas System Division of Agriculture. When I first started in my position in 2016, it was hard to envision how we would be able to make use of gene editing given our lack of understanding of fundamental genetics in these specialty crops. However, advances in genomics in the past seven years have enabled the discovery of genes associated with disease resistance, flowering time, and consumer quality traits, even in relatively low-acreage crops like blackberries and muscadine grapes.

For example, elite wine and table grape varieties are susceptible to many diseases. In a typical year, growers can be expected to make 10-15 fungicide applications. This heavy spray schedule causes environmental impacts and financial burdens for growers. There are 45 known disease-resistance loci within the sexually compatible gene pool for grapes, many of which were discovered in part due to funding from the USDA-NIFA Specialty Crops Research Initiative. The process of backcrossing these resistance loci from wild relatives to elite germplasm is incredibly time-consuming, especially considering the long generation time in many perennial specialty crops. Traditionally, it has taken 20-80 years from making an initial cross to release of a new grape cultivar with a disease resistance locus. And, unfortunately, the market for new disease-resistant wine grape cultivars is limited as many consumers demand traditional wine grape varietals like Cabernet Sauvignon or Pinot Noir. Gene editing could be used to develop a cultivar that is identical to Cabernet Sauvignon with stacked resistance loci for powdery and downy mildew resistance in a fraction of the time of traditional breeding methods. This technology would enable consumers to enjoy the same wines that they love, while allowing growers to drastically reduce the number of fungicide applications they make each year.

Appropriate policies can incentivize investments in plant breeding innovation, such as gene editing, creating new jobs and market opportunities, and boosting resiliency and sustainability along the entire food value chain. In order for the tremendous benefits of these innovations and others like them to become widely available, the U.S. government must create an innovation-enabling environment that includes sustained and substantial investment in public-sector agriculture research; fair, strong, and enforceable protection for intellectual property

rights to incentivize entrepreneurship and public-private technology transfer; science-based, predictable and transparent regulatory policy in the U.S.; and regulatory policy alignment around the world. While Farm Bill reauthorization plays a key role, the utility of new innovations in plant breeding will be limited without effective policy and regulatory systems in place to allow for and foster continuing innovations such as these.

Impediments to Access

Many countries have recently put forth policies that exempt or exclude plants produced through gene editing from additional regulations with clear efficient implementation of the policies. However, differences in key elements of these exemptions or exclusions mean the overall utility for plant breeding innovation varies greatly. For example, EPA's final rule—published less than two weeks ago—on plant-incorporated protectants (PIPs), is causing a great deal of concern in the plant breeding community. This is in large part due to EPA's focus on the process used to create the product, rather than the product itself.

EPA's updated policy is intended to address new and evolving breeding methods like gene editing. The goal is to establish new "derived from sexually compatible plant"-based exemptions for certain PIPs that were introduced using the tools such as gene editing that result in plant characteristic(s) that could have been created using conventional breeding. However, contrary to EPA's approach to similar products created using conventional breeding, the rule adds bureaucratic layers of red tape for products developed using gene editing -- even though the agency views those products as posing no greater risk than those produced through conventional breeding; keep in mind that conventional breeding also includes plants created by making mutations much more imprecisely, including using radiation and chemical-induced mutagenesis.

Furthermore, the exemptions represent a narrow set of sexually compatible derived PIPs that are possible using gene editing. For this narrow set of exemptions, EPA's rule takes a highly restrictive and precautionary approach, particularly compared to important trading partners and agricultural competitors such as Canada, Argentina, and Brazil. In doing so, EPA imposes burdensome data requirements on developers who must undertake a mandatory premarket process to confirm "eligibility" for the exemption. "Exempt" PIPs are also subject to a recordkeeping requirement. None of these requirements are imposed on similar conventionally-bred PIPs.

A recent European Commission study found that new breeding techniques afford, "an opportunity for small and medium enterprises (SMEs) to develop minor, niche or orphan crops, and special traits in plants, in response to local needs." I agree, and want to see the full benefits of innovation harnessed across all crops and all sectors.

The transactional costs of compliance are very likely to result in higher prices for the end-product than otherwise would have occurred, thus adding a premium for developers, farmers, and ultimately consumers. Such a premium could serve as a countervailing force to uptake, and

in turn, impede the very-real societal benefits these tools can deliver. This is particularly true for SMEs, which are far less able than larger companies might be, to bear the costs, extended process, and potential market delays. In other words, process-based differential regulatory systems will have a negative effect on the democratization of the technology. The higher the cost or barrier, the greater the market concentration we can expect — the tools will be limited to large companies, in a few large-acre crops, and focused on a few large-acre traits.

I recently co-authored a paper in Nature Plants that demonstrated how various breeding methods, including gene editing, can lead to the same seedless grape phenotype (Jenkins et al. 2023). The same can be said for pest-resistant phenotypes. In essence, precision tools like gene editing can allow us to reach the same outcome as could be achieved through more traditional breeding methods, or that could have happened in nature over time through natural mutation, but in a much more targeted and efficient way. This is the beauty of innovation: we are constantly learning, improving, and finding new and better ways of doing things – in plant breeding, just like in all areas of society. This is critical as we're up against the clock to address the very real and rapidly evolving threats facing the future of a secure and sustainable food and agriculture system. We can't rely on the tools of yesterday to address the challenges of tomorrow.

To quote the 1992 Update to the U.S. Coordinated Framework, Federal oversight "focuses on the characteristics of the biotechnology product and the environment into which it is being introduced, not the process by which the product is created." By focusing on the process rather than the product, EPA's recent rule runs counter to this intent. Here is an example of how the agency's policy of differential treatment would play out in the real world:

- A developer of a disease-resistant grape variety generated through conventional breeding will have no requirements from EPA prior to putting this product into commerce.
- The same developer could then use a more efficient method of breeding, like gene editing, to generate the exact same disease resistance characteristic in another variety of grapes. The PIP is the same, however, the developer will have to make a submission to EPA, providing data to justify that the variety is eligible for the "PIPs created through genetic engineering from a sexually compatible plant" exemption. The developer will have to wait for EPA to confirm their justification and maintain records for 5 years.

Precision breeding tools like gene editing are desperately needed to support the production of more resilient plants, that can grow, for example, with less water, pesticides and other inputs, and result in fruits and vegetables that stay fresher longer. These are all important characteristics needed by U.S. farmers to address sustainable agriculture production and food security.

At the domestic level, the EPA rule runs counter to interagency alignment under the U.S. Coordinated Framework, at odds with regulatory streamlining enabled and envisioned under USDA's recent revisions to its Part 340 regulations. Internationally, the rule is out of step with a

growing list of international regulatory authorities that have used a science-based rationale to streamline their policies to support the commercialization of innovative products. Historically, U.S. leadership in innovation-enabling regulatory frameworks has attracted investment and entrepreneurship to our country, ensuring our farmers have access to the latest improved varieties. However, in this area, the U.S. is now at risk of losing out; and U.S. farmers could lag behind in access to the latest improved varieties, as compared to their counterparts in other areas of the world. Now is not the time to impose barriers to U.S. innovation, especially in specialty crops; but unfortunately, that's exactly what EPA's new policy has done. Instead, the U.S. should be a global leader in science-based policies that drive innovation and enable the benefits of gene editing to be realized around the entire world.

The bottom line is that these added and unnecessary regulatory burdens will increase the cost and time of getting new improved varieties in the hands of our farmers. Many public sector and SMEs, especially those working in small acreage crops, will not be able to afford the additional cost. All of this will force additional consolidation in the industry; investments in future innovation will be limited to a handful of crops and a handful of companies.

Innovative Crop Protection and Biostimulant Tools

Seed innovation is of course not limited to plant breeding. Modern tools like precision seed treatments help protect the developing seed during its most vulnerable time – at planting and germination. Their highly targeted approach means less impact on the surrounding environment, and allows farmers to increase productivity while using less – that's a win for a farmer's bottom line and a win for the environment.

Biostimulants are another emerging and promising tool to support a more sustainable agricultural and food system, for example, to help mitigate or reduce GHG emissions, conserve and replenish soil health, and improve water quality. The last Farm Bill recognized the importance of biostimulants and directed USDA to complete a report identifying recommendations, including potential definitions for plant biostimulants. The final report was a valuable step; however, until a clear definition is established, the regulatory path to market is unclear.

To fully realize the value of these tools, it's important that the Farm Bill sets a clear, federal definition, as called for in the Plant Biostimulant Act recently introduced in the Senate and the House. Thank you specifically to Senator Braun for leading, and to Senator Grassley for cosponsoring this key legislation. This would create needed certainty to ensure these innovative tools are broadly available to producers.

AGRICULTURAL RESEARCH

A safe and secure agriculture and food production system begins with high performing varieties. Better seed and better plants are generated through innovation; and innovation is a direct result of strong investments in agricultural research. The U.S. seed and plant breeding

community relies on the support of Farm Bill funding and programs to ensure continued leadership as the provider of the best seed to the world. U.S. breeding and seed companies, public and private scientists, and U.S. producers will continue to innovate to improve crops and production practices, thanks to ongoing and future cutting-edge research. Strong investments in research from discovery through development lead to better varieties, which means better outcomes for farmers, consumers, and the environment, in the short and long term.

The University of Arkansas System Division of Agriculture Fruit Breeding Program has benefitted tremendously from Farm Bill funding since its inception in 1964. We have received support from Hatch Act funding and competitive USDA-NIFA programs including Agriculture and Food Research Initiative (AFRI) and Specialty Crops Research Initiative (SCRI) that have supported many graduate students and helped us to train the next generation of public and private sector specialty crop breeders and allowed us to develop innovative new products like thornless blackberries that fruit on first-year canes and highly-flavored table grapes. I want to especially thank this Committee for their efforts to reinstate the SCRI match waiver by working with the Appropriations Committees over the last few years. I hope that the next Farm Bill will include a long-term solution.

We have also benefitted indirectly from Farm Bill funding to our valued colleagues and collaborators at the USDA Agricultural Research Service, the National Clean Plant Network (NCPN), and the National Plant Germplasm System (NPGS). Because of the support we received from Farm Bill Funding, we have publicly released 66 fruit varieties that are now grown in Arkansas and around the world on six continents. These innovative new varieties have generated profits for growers, nurseries, and shippers/marketers and provided healthful and exciting options in the produce aisle for consumers across the U.S.

Agriculture research is the foundation for advancing U.S. innovation in the specialty crop sector, and ensuring a strong return on investment in public and private ag research dollars. Robust funding for primary USDA research is essential, and desperately needed to continue supporting the work of programs like the NPGS, NCPN, and SCRI.

CONCLUSION

Thank you, again, for the opportunity to provide testimony on behalf of the seed industry and the plant breeding community. We look forward to serving as a resource as important discussions continue related to the Farm Bill and breeding and seed innovation in general. I'll be happy to answer any questions you have.

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