New plant cultivars are developed in both the private and public sector. Much of the work done in the private sector is focused on corn, soy, and other high-value crops. Researchers in the public sector are more likely to deal with minor crops, perennials, or specialty crops within a specific geographical region and are typically based at land grant universities or with the USDA. Although public breeding programs have a high return on investment, there has been an overall decline in funding for them in recent decades.

As funding has decreased, there has been an increase in intellectual property protections for cultivars developed at public universities. Intellectual property protection may provide a revenue stream for the university but can also limit the use of germplasm in further research and development. William Tracy, a plant breeder at the University of Wisconsin–Madison, and colleagues are interested in how increased intellectual property protections are impacting plant breeding in the public sector.

Tracy is a co-author on a recent article in Crop Science (http://bit.ly/2wVzP5b) summarizing results of a survey that asked plant breeders how intellectual property and material transfer agreements (MTA) affect their work. Survey questions were developed with input from an intellectual property symposium. Focusing on the responses of plant breeders actively releasing finished cultivars, the article provides information about restrictions put on shared germplasm and the current status of plant breeding programs from across the U.S.

The authors report that more than 50% of respondents indicated the most common source of new genetic material used in their own breeding programs is germplasm from other programs. In addition, almost all respondents reported sharing germplasm with others. However, approximately 60% of respondents indicated sharing germplasm under a material transfer agreement, and 70% of respondents indicated most or all of their cultivars had some form of intellectual property protection.

Given the prevalence of intellectual property protection, it is not surprising that greater than 55% of respondents indicated intellectual property restrictions on germplasm from public breeding programs have a negative impact on their work. This suggests that the short-term gain in revenue from intellectual property protections could result in a long-term barrier to the development of new cultivars in the public sector.

One way to alleviate some of the MTA restrictions, according to Tracy,
would be if researchers could develop a set of agreed-upon best practices among public plant breeders. Currently, individual researchers and their universities set up MTAs, leading to wide variation in MTA restrictions from one institution to the next. With widely accepted guidelines, universities could balance the need for intellectual property protection, and researchers could gain greater access to germplasm sources to advance plant breeding programs.

The survey also revealed how demographics could lead to a setback in public cultivar development and release in near future. More than 55% of respondents had been in the field for 21 or more years. As these individuals retire, cultivar release is likely to decline until early career breeders establish programs. Making the situation worse is the fact that almost a quarter of respondents said that there was no plan for their position to be maintained, and another third were unsure if their position would be continued. This would affect not only cultivar development, but also limit the potential for students to gain hands-on training in plant breeding, a skill that will still be in demand.

One area of focus in public breeding could be to develop crops resilient to a more variable climate, Tracy says, such as, “profitable forage crops or perennial crops because perennial crops can better resist severe weather events and come back and grow quickly, perhaps getting the farmer some profit.” Tracy and his co-authors hope to bring the issues raised in this article to the attention of plant breeders and university administrators, who can help find a way to balance intellectual property with cultivar development and look for new opportunities for public-sector breeding programs in the future.

Dig Deeper
Read the full study in Crop Science: http://bit.ly/2wVzP5b.

Public plant breeders request germplasm from other institutions for their research regularly.
Public plant breeding programs limit use of germplasm by other institutions through intellectual property protections.
The future of public breeding programs is uncertain as current researchers retire but are not replaced.