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Dr. Patrick Moore
2015 Wilder Medal Recipient

Dr. Patrick Moore was recognized by the American Pomological Society for his work in red raspberry and strawberry breeding through the award of the Widler Medal for 2015. He has released or co-released 18 cultivars in his career, including eight red raspberries and 10 strawberries.

Dr. Moore grew up in North Portland, OR along with two brothers as the middle child. He attended grade school and high school in Portland, OR graduating in 1970. During summers in grade school and high school he earned money picking strawberries, raspberries, blackberries, and beans on Portland area farms.

He received his Ph.D. in forestry from Michigan State University in 1980, with his dissertation title "Developmental Variation in Volatile Oil of Blue Spruce." His M.S. degree in forestry with a minor in plant breeding was awarded in 1976 from the University of Minnesota with the thesis title "Variation in Isozymes of Amylase, Leucine Aminopeptidase, and Esterase in a wide collection of *Pinus banksiana* Lamb." His B.S in forestry was attained from Oregon State University in 1974.

His primary professional appointment has been at the Washington State University, Puyallup Research and Extension Center where he has been employed since 1987 and has led the red raspberry and strawberry breeding efforts during this entire period. He was appointed Professor in 1999. Prior to appointment with Washington State, he worked as a Research Associate at Michigan State University as well as a Research Forester with International Paper Company, Bainbridge, GA and Natchez, MS.

The Pacific Northwest industry is predominantly a processing market but there is a significant fresh market as well and Dr.

Moore has released cultivars suited for both markets. His strawberry releases have been noted for their durability. Between 1.0 and 2.5 million plants of 'Puget Reliance', his first strawberry release, have been sold per year for the past 15 years. These significant plant sales are even more impressive given that, unlike the old standards 'Totem' and 'Hood' that produce for 2-3 years, 'Puget Reliance' is very long lived with one grower having a 13-14 year old field still in production. The other two in the Puget series, 'Puget Summer' and 'Puget Crimson' have become standards for outstanding flavor in late season ripening berries. 'Puget Crimson' is rapidly replacing 'Puget Summer' as it has the outstanding flavor of 'Puget Summer' with significantly larger fruit.

One of the trademark characteristics of the three public Pacific Northwest (PNW) berry breeding programs (Wash. St. Univ.,

USDA-ARS Corvallis, Agriculture and Agri-Food Canada) has been the commitment to collaboration. This collaboration traces back to the early to mid-1900s and continues today even with the challenges that operating with intellectual property rights entails. Dr. Moore was the first of the berry breeders in the Pacific Northwest to navigate the 'Plant Patenting' trail and has been critical to this process as the breeders with the USDA and AAFC began down this path. His willingness to share germplasm and ideas has made this process productive. Because of this collaboration, Dr. Moore was also critically important in six USDA and one AgCanada strawberry releases. 'Puget Reliance' is a parent of 'Tillamook', which has been the top or one of the top two selling cultivars in the past few years, and according to a major processor may account for over 50% of the fruit produced in Oregon. Plant sales of strawberry cultivars Dr. Moore has been involved with developing approach 66 million plants.

Dr. Moore's red raspberry program has also been very successful. The PNW red raspberry industry has had an interesting history over the past 20 years as it has expanded tremendously and tried to come to grips with new problems as well as with old problems that have returned. *Raspberry bushy dwarf virus* (RBDV) causes the fruit to be crumbly and not suited for machine harvesting or for high-value individually quick frozen (IQF) fruit. This problem reached a critical stage in the mid to late 1990s and caused many promising selections to be discarded as they were susceptible to RBDV and slowing the progression of selections through the developmental process. At the same time, a chemical that had been used to keep root rot in check lost its effectiveness and root rot became a much more significant problem for the industry. Dr. Moore, working with pathologists, was able to identify new sources of root rot resistance and incorporated that into his breeding program. He has taken advantage of the high levels of *Phytophthora fragariae var. rubi* at the research farm to screen selections, cultivars, and germplasm from the WSU program and other programs for tolerance to this pathogen, thereby identifying germplasm with high levels of root rot tolerance. Out of this effort, 'Cascade Bounty' and 'Cascade Delight' were released. 'Cascade Bounty' has outstanding root rot resistance and despite only acceptable fruit quality approximately two million plants of it have been planted. 'Cascade Delight' does not have the outstanding root rot resistance of 'Cascade Bounty' but it is better than most if not all high-quality red raspberry cultivars for root rot tolerance. Over one million plants of 'Cascade Delight' have been sold over the past 10 years in the U.S. and Canada and, more recently, a large number are now being sold in Europe and Australia. While the problem of RBDV and root rot have not been solved, the germplasm that is being tested now has much better levels of resistance than in the past.

Labor is very expensive, especially to harvest red raspberries. While red raspberries can be effectively harvested by machine, the quality standards are much higher than in the past and it is more essential than ever to be able to produce a high percentage of IQF-quality fruit that has the highest value in the processing market. Identifying red raspberry selections and cultivars that can be effectively machine harvested has become essential. Dr. Moore has utilized a mechanical harvester in his seedlings and/or to evaluate his selections in the first stage after selection to increase the percentage of his germplasm that meets these criteria. His newest release, 'Cascade Harvest', is the first to result from these efforts, and shows a tremendous amount of promise for producing a high quality machine harvested product. Sales of red raspberry cultivars Dr. Moore has been involved with developing approach 5 million plants.

In addition to Dr. Moore's contributions in cultivar releases and being a critical component of the PNW small fruit breeding collaboration, he has served the scientific

community. He has been one of the co-editors of the red raspberry section of the Register of Fruit and Nut Cultivars for the last three Lists and has served as an Associate Editor for HortScience. Dr. Moore has steadily published throughout his career with an emphasis on research in trying to understand the genetics/heredity of fruit quality, disease resistance, and insect resistance in red raspberry and strawberry. As molecular tools have begun to be more widely utilized, he has worked to adapt them to red raspberry with particular interest in developing genetic markers for RBDV resistance. This has flowed nicely from some of his earlier work screening germplasm for resistance to these problems.

Dr. Moore exemplifies the ideals laid out by the American Pomological Society for the Marshall P. Wilder award. He has "rendered outstanding service to horticulture in the area of pomology" for several reasons, but particularly for his development of extremely important strawberry and red raspberry cultivars that are leaders in the PNW industry and increasingly in similar environments around the world. What is harder to catch in statistics and citations is Dr. Moore's ability to help people work together. He is always part of these collaborative teams whether between industry and the university, between breeders, between grower organizations, or between institutions as he has great insight, helps people get along and work together and most importantly follows through on what he says he is going to do.

He was presented the Wilder Medal on 6 Aug. 2015 at the Annual Joint meeting of APS and ASHS, New Orleans, LA. This article was prepared by John R. Clark and Chad E. Finn.