

## State of Oregon Annual Report for Calendar Year 2018

### W-6 Technical Committee

Compiled by Shawn A. Mehlenbacher

Oregonians continue to use the PI system extensively. Users include state and federal researchers as well as private seed companies and private individuals. Oregon is a major user in the western region, along with California and Washington.

#### Progress Reports:

**1. Shawn A. Mehlenbacher**, Dept. of Horticulture, Oregon State University, Corvallis, OR 97331.

Two graduate students developed new simple sequence repeat (SSR) markers in previously-identified eastern filbert blight (EFB) resistance regions and studied resistance from 21 new sources. Merve Sekerli (M.S. student) developed new SSR markers near EFB resistance loci on LG2 and LG7. These correspond to scaffolds 1 and 7 in the 'Jefferson' genome sequence (V3). Of these, segregation in the mapping population allowed placement of 19 on LG2 and 9 on LG7. Golnaz Komaei Koma (Ph.D. student) developed 19 new SSR markers from four contigs of the genome sequence (V2), of which nine were placed on LG6 of the linkage map near the 'Gasaway' resistance locus and 10 were placed on LG1. These markers proved useful in investigating 21 new sources of EFB resistance. Ten sources of resistance were assigned to LG6 near the 'Gasaway' resistance locus [Rutgers selections 3-04-23, 3-04-28, 3-04-30, and 3-13-40 from seeds purchased in a market in Holmskij, Russia; OSU 1185.126 from seeds purchased near Simferopol, Crimea, Moscow selections #23 and #26 received as scions from the Russian Research Institute of Forestry and Mechanization near Moscow, Russia; *C. heterophylla* 'Ogyoo' from the Republic of Korea; 'Estrella #1' from Cecil Farris in Lansing, Michigan; and OSU 533.129 from seeds sent by C. Farris in Michigan. Resistance in one (OSU 1187.101 from seeds purchased in Holmskij, Russia) was assigned to LG2 near the "Georgian" resistance locus. Resistance in four (Rutgers 3-12-62 from seeds purchased near Simferopol, Crimea; OSU 1166.123 from seeds harvested from a redleaf selection at the Subtropical Research Institute in Sochi, Russia; and Moscow selections #2 and #27). Resistance from six additional sources has not yet been assigned to a LG: Rutgers selections 3-04-05 and 3-07-11 from seeds purchased near Simferopol Crimea, Moscow #37, two selections of *C. americana* ('Winkler and OSU 366.060 from Mississippi), and OSU 401.010 from seeds received from Ken Bauman in Ohio.

New sources of EFB resistance continue to be investigated. Resistant accessions are crossed with susceptible selections, and the resulting seedlings exposed to EFB under a structure topped with diseased branches. The results showed that Dickum Hybrid OSU 1044.086 (presumably *C. americana* x *C. avellana*) and five selections (OSU 1229.082, 1233.007, 1233.145, 1240.131, and 1242.146) from seeds collected in Giresun, Turkey transmit resistance to about half of their offspring. These new sources of resistance will be assigned to a LG in the future.

The OSU hazelnut breeding program has also identified a diverse set of 78 selections with a level of quantitative resistance similar to the check 'Tonda di Giffoni'. These develop a few small cankers following structure exposure.

**2. Vidyasagar Sathuvalli**, Hermiston Ag Research & Ext Center, Oregon State University, Hermiston, OR

The OSU potato breeding utilizes germplasm from the U.S. Potato Genebank in Sturgeon Bay, WI. The 2019 request was for European cultivars for introgression of European genes into the OSU program. Five haploid inducers were also requested and are being used to generate dihaploids from russet selections.

S.No	Family	Female Parent	Male Parent	FP_Trait	MP_Trait	Seed
1	OR19293	PAYETTE RUSSET	LIBERTAS	PVY	Netherlands	2400
2	OR19295	OR05039-4	STICK VALLEY	VW	S.Korea	500
3	OR19296	OR05039-4	MORENE	VW	Netherlands/PCN	550
4	OR19297	OR05039-4	LIBERTAS	VW	Netherlands	650
5	OR19004	LOMAN	P0R00LB6-1	Guatemala/PVX	LB	1000
6	OR19012	PERRICHOLI	P0R00LB6-1	Peru	LB	750
7	OR19016	SILVERTON RUSSET	LIBERTAS	ML	Netherlands	1050
8	OR19025	SILVERTON RUSSET	MARIA HAUNCA	ML	Peru/Red	300
9	OR19028	AO00057-2	JASMIN	ML	Poland/PVY-X	450
10	OR19039	SILVERTON RUSSET	JASMIN	ML	Poland/PVY-X	850
11	OR19052	SILVERTON RUSSET	MORENE	ML	Netherlands/PCN	900
12	OR19056	SILVERTON RUSSET	STICK VALLEY	ML	S.Korea	550
13	OR19176	SARPO MIRIA	A071012-4BF	LB	ML	300
14	OR19276	AO95245-2	LIBERTAS	ML	Netherlands	1350
15	OR19278	PAYETTE RUSSET	MARIA HAUNCA	PVY	Peru/Red	650
16	OR19281	TARGHEE RUSSET	MARIA HAUNCA	ML	Peru/Red	350
17	OR19282	PAYETTE RUSSET	ALPHA	PVY	Netherlands	400
18	OR19283	TARGHEE RUSSET	LIBERTAS	ML	Netherlands	600
19	OR19290	AO95245-2	JASMIN	ML	Poland/PVY-X	550
20	OR19299	AO95245-2	STICK VALLEY	ML	S.Korea	200
21	OR19300	AO00057-2	MORENE	ML	Netherlands/PCN	700
22	OR19304	AO00057-2	LIBERTAS	ML	Netherlands	1300
23	OR19308	OR05039-4	JASMIN	VW	Poland/PVY-X	550
24	OR19309	AO00057-2	MARIA HAUNCA	ML	Peru/Red	166
25	OR19310	AO00057-2	STICK VALLEY	ML	S.Korea	400
26	OR19311	AO95245-2	MARIA HAUNCA	ML	Peru/Red	200
27	OR19315	TARGHEE RUSSET	MORENE	ML	Netherlands/PCN	750
28	OR19316	AO95245-2	MORENE	ML	Netherlands/PCN	225
29	OR19325	POR00LB6-1	JASMIN	LB	Poland/PVY-X	175
30	OR19327	ACKERSEGEN	P0R00LB6-1	Germany	LB	300

**3. Casey Wilson,** Dept. of Horticulture, Oregon State University, Corvallis, OR 97331

Casey is a graduate student in Jim Myers' vegetable breeding program. He ordered seeds of 21 accessions of *Physalis* species for what he calls "a side project" of breeding *Physalis peruviana* for improved adaptation and productivity in the Willamette Valley. *Physalis peruviana* has potential to be a specialty crop in the Pacific Northwest, but much of the available material is poorly adapted to temperate climates. Fruit set is often cut short by frost, thereby reducing yields. The *Physalis* material was originally requested for use in wide crosses with *Physalis peruviana*. Prior to receipt of this seed, Casey made 12 F1 crosses between *Physalis peruviana* parents that were collected from various sources. The F1 generation was seeded and planted out to collect seed for an F2 generation that will possibly be grown next year. Segregation will be observed, and selections will be made. Wide crosses may be attempted with appropriate candidates of the requested *Physalis* material to evaluate compatibility. The material in this order was seeded in spring 2020 and planted out for observation. Seed increases will be made where possible and observational data will be collected. Collecting a diversity panel of *Physalis* species is the first step in a potential breeding project to evaluate crossability between species. For people interested in reading more about cape gooseberry (*Physalis peruviana*), he suggests the following articles.

Liberato, X., E. Sánchez-Betancourt, J.H. Argüelles Caredenas, C. Gonzolez, and V. Nunez.

2014. Citogenética de genotipos de uchuva, *Physalis peruviana* L., y *Physalis floridana* Rydb., con respuesta diferencial a *Fusarium oxysporum*. Ciencia y Tecnología Agropecuaria, 15(1):51–61. [https://doi.org/10.21930/rcta.vol15\\_num1\\_art:396](https://doi.org/10.21930/rcta.vol15_num1_art:396)

García-Arias, F.L., Osorio-Guarín, J.A., & Núñez Zarantes, V.M. (2018). Association study reveals novel genes related to yield and quality of fruit in cape gooseberry (*Physalis peruviana* L.). Frontiers in Plant Science 9. <https://doi.org/10.3389/fpls.2018.00362>

Herrera M, A.M., Ortiz A, J.D., Fischer, G., & Chacón S, M.I. (2011). Behavior in yield and quality of 54 cape gooseberry (*Physalis peruviana* L.) accessions from north-eastern Colombia. Agronomía Colombiana; Bogota, 29(2):189–196.

Klinac, D.J. (1986). Cape gooseberry (*Physalis peruviana*) production systems. New Zealand Journal of Experimental Agriculture, 14(4):425–430. <https://doi.org/10.1080/03015521.1986.10423060>

Trillos González, O., Cotes Torres, J.M., Medina Cano, C.I., Lobo Arias, M., & Navas Arboleda, A.A. (2008). Caracterización morfológica de cuarenta y seis accesiones de uchuva (*Physalis peruviana* L.), en Antioquia (Colombia). Revista Brasileira de Fruticultura, 30(3):708–715. <https://doi.org/10.1590/S0100-29452008000300025>

**4. Thomas Wolpert,** Dept. of Botany and Plant Pathology, Oregon State University, Cordley Hall, Corvallis, OR 97331

Seeds of 16 *Eragrostis curvula* accessions were ordered and tested for their response to an isolated fungal effector. The testing was based on a hypothesis that there may be responses related to the reaction of these accessions to certain races of *Magnaporthe*. Unfortunately, the experiments did not support the hypothesis and further research will not likely be conducted.

**"This resource is a uniquely valuable source of germplasm for experimentation and is very much appreciated."**

- 5. Neil Bell**, Community Horticulturist, OSU Extension Service - Marion and Polk Counties, 1320 Capitol Street NE #110, Salem, OR 97301

He received cuttings of 24 olive cultivars in July, 2019. The cuttings were stuck in the greenhouse at the North Willamette Research and Extension Center (NWREC) in Aurora, OR, and the rooted cuttings were potted in February and March 2020. The rooted cuttings are being grown on at NWREC this summer and together with accessions acquired in prior years, will be planted out in a randomized, replicated cold hardiness evaluation of approximately 120 cultivars at NWREC in spring, 2021. The field evaluation will continue indefinitely in order to collect cold hardiness, plant growth, flowering and fruit data.

- 6. Renee L. Eriksen** (post-doc), USDA-ARS NFSCRU, 3450 SW Campus Way, Corvallis, OR 97331

Plants of six accessions of *Humulus lupulus* var. *neomexicanus* and one of *H. l.* var. *lupulus* were requested and will be included in experiments to test carbon assimilation rates and in vivo Rubisco activity under increasing high temperature and low-water stress. The goal is to understand their response to abiotic stress for improvement of the hop germplasm.

- 7. Haley Smith**, Seed Program Coordinator, Dorena Genetic Resource Center - US Forest Service, 34963 Shoreview Rd, Cottage Grove, OR 97424

The Dorena Genetic Resource center utilized cuttings of a *Ribes nigrum* accession from the USDA-ARS Repository in Corvallis to produce plants for inoculum production in their efforts to breed pine resistant to white pine blister rust. Infected leaves from the *Ribes* cuttings were applied to pine species being evaluated for resistance to the non-native pathogen *Cronartium ribicola*. The trees were successfully inoculated, but the results have not yet been tabulated. **"We greatly appreciate the assistance the USDA-ARS has been in helping us to develop resistant individuals of the many pine species we work with."**

- 8. Robin Lamp**, Forage breeder, Barenbrug USA, Research, Albany, OR

Seeds of six accessions of *Eragrostis tef* were requested and planted in the greenhouse, but COVID became an issue and staffing became limited. They still have seed and look forward to resuming the work next spring when hopefully things will be back to normal.

- 9. Yedilaklil Hunde**, Director of Research, Barenbrug USA, Research, Albany, OR

Seeds were requested by Miles Barrett of one accession of *Festuca arundinacea* and one of *Poa pratensis*. They are currently being used as checks in morphological studies to generate data for registering their experimental varieties.

- 10. Virginia Lehman**, Blue Moon Farm LLC, 33754 Tennessee Road, Lebanon, OR

Three accessions of hairy vetch (*Vicia villosa*) were used to evaluate their contribution for vigor in breeding for a new cover crop hairy vetch. At this time, they have just made the initial crosses. They will continue to monitor the field performance of the selections made. One accession of Kentucky bluegrass *Poa pratensis* was ordered. It has a history of making successful hybrids, and it was used as a female parent in crosses this spring. Only just now is seed harvest beginning. Hopefully the seedlings will be hybrids (rather than apomictic offspring)

that can be evaluated beginning in spring 2021. **"We appreciate the valuable resources that the PI system has provided to our research program."**

**11. Jerry Hall**, Grassland Oregon, 4455 60th Ave NE, Salem, OR

Seeds of five accession were requested. They did not establish the *Vicia faba* last fall but will be doing so this coming fall. The *Trifolium tembense* was planted in the greenhouse. The *Medicago falcata*, Baron, and Kentucky 31 were planted in a PVP nursery for morphological measurements.

**12. Rebecca Turner**, Nunhems USA, a BASF Company, 8850 59th Ave. NE, Brooks, OR

Allium accessions (37) were requested for an investigation of susceptibility to thrips in wild allium species. The requested materials are being used in a consortium project led and coordinated by Olga Scholten of Wageningen University in the Netherlands. These materials have only just been germinated in the 2020 season. So far the main observation is that germination has been spotty and generally poor.

**13. Mike Lassner**, Amfora Inc., 4262 SE Belmont Street, Apt. 301, Portland, OR

An accession of high protein soybean *Glycine max* germplasm was requested on behalf of Amfora Inc. He is the CSO of Amfora, a virtual company dedicated to improving the protein content of crops. Amfora plans to use 'Highpro 1' and other germplasm we may request in the future to develop commercial soybean (and other crop) varieties with improved nutritional properties. The varieties may be used in applications prototyping or as base germplasm for breeding and gene editing.

**14. Peter Kahn**, OMIC USA, 3344 NW Industrial St, Portland, OR

Four accessions of rice (*Oryza sativa*) ('Jaya', 'Karnal Basmati', 'Basmati 198' and 'IR64') were requested for use as control material in their rice variety identification program. They work with imported food grain, primarily Japanese cultivars, and want to verify the cultivar. SSR markers are scored and allele sizes compared to those in their database.

**15. Quinn Gillespie**, Universal Seed Co, 1285 N. Main Street, Independence, OR

He is the manager of a new seed lab. Samples of seeds of ten species were requested. They wanted to have to have verified USDA samples for laboratory reference and identification.

**16. Jie Liu**, ADM Nutrition - an Archer Daniels Midland Company, 4091 West 11th Ave, Eugene, OR 97402

Plants of five accessions of *Mentha aquatica* were requested for use in research on genetic diversity. He obtained SNP markers from these mints. "I really appreciate the services USDA offered in *Mentha* collection."

**17. Gregory C. Biza**, Vice President and Technical Director, RCB International Ltd., 39878 Turnidge Rd. NE, Albany, OR.

One accession of *Mentha aquatica* was requested for use in research. Some greenhouse trials have been initiated on oil quality, vigor, and performance when grown with common mint diseases in the Willamette Valley. If the research results are promising, they may proceed further.

**18. Leonard Foltz**, Dancing Oaks Nursery, 17900 Priem Road, Monmouth, OR 97361

One accession of pear (*Pyrus communis* 'Johantorp') was requested, received and grafted. They will produce scions for future grafting, with trees eventually sold to the gardening public. "I experienced tasting some of the varieties we obtained at the Home Orchard Society All About Fruit Tasting but then became disappointed to discover that some of them were hard to obtain. At our nursery, we appreciate the importance of a diversity of plant selections whether it is a perennial, shrub, tree, bulb, or edible plant. **I believe that the national plant collections are a valuable asset to agriculture, breeding programs, and the public as diverse sources of food crops.**"

**19. Paul Stormo**, Champoe Nursery, 9661 Yergen Rd. NE, Aurora, OR

He collected seed of four *Corylus colurna* trees in the USDA Repository collection and used it to propagate seedlings requested by one of their customers. After failing to locate commercial suppliers of this seed, he contacted the USDA because he had heard there was a collection of plants on the farm in Corvallis. The seed he collected was hand cleaned after minimal drying in the husk. Viability was good and germination rates high.

**20. Sam Hubert**, One Green World, 6469 SE 134th Ave., Portland, OR

Accessions of three genera were requested for evaluation and possible introduction to the nursery trade and for use in home gardens and specialty market farms. This year's request was for 18 accessions of *Ficus carica*, 25 of *Morus* spp and 3 of *Actinidia* spp. At one point the Pacific Northwest had viable fig production farms and he'd love to see a resurgence of that as well as mulberries given their supreme adaptability to our climate and relative lack of pests and diseases. The USDA's germplasm repository has been invaluable to them not only in providing plant material but giving them the proper identification of each variety. They're still currently trialing many of these varieties to see how they perform in our climate but the interest from their customers is certainly present. He is beginning to see the first significant fruit set this year on many of their plants. Aside from the "common", or parthenocarpic figs, they're also interested down the road in trialing the male caprifigs here and introducing the fig wasp (*Blastophaga psenes*) to our climate. He has seen them at relatively high elevations in parts of northern California that regularly receive frost leading him to believe that the wasp may have a chance here. **"The material we've received from the USDA is cherished and invaluable. Thank you so much for maintaining these collections."**

**21. Mark Krautmann**, Heritage Seedlings Inc., 4194 71st Ave. S.E., Salem, OR

He ordered scions of one pear accession, *Pyrus communis* 'Normannischen Ciderbirne'. We intended to propagate by budding but could not get rootstock in time. He will try again.

**22. Joe Kepiro**, Central Point, OR

Five accessions of rice (*Oryza sativa*) were ordered. His objective is to grow rice in Oregon, starting with trials of some varieties to see if they are suitable for the southern Oregon climate. He got a very late start and did not plant the seeds until June 21st 2019. The location was less than optimal, because there was part of the day with shade from a large tree. The rice varieties did not have a good set and most did not produce seed. The seed source was old for some varieties and did not germinate. He decided to use only rice with early maturity, flowering

in 80-90 days. Some of the early seed he attempted to trial last year did not germinate. He notified the USDA, but could not get fresh seed this year. So he is waiting until 2021 to get a new synchronized start and maybe relocate to the Klamath Falls area instead of the previous location in Rogue Valley. He is still optimistic that he can get the early varieties that were previously commercial in California to grow and set a profitable crop. He would like to get the USDA-ARS involved and get some support for labor and material and equipment and land. He feels that this may be a great opportunity to increase the Calrose type rice to sell to China. It will take a few more years to increase seed and trial for the growing season in Klamath Falls.

**23. Will McClatchey, Woodland Valley Meadows Farm, 28281 Hamm Road, Eugene, OR**

He submitted a lengthy report on his evaluations of apple cultivars for cider.

"I cannot say that I have made a lot of progress in the last year, but here is a summary of what I have been doing with these grafts. I have been interested in the roles of unusual flavors in ciders since I worked with a couple of cider makers in Germany and Canada about 20 years ago who each added less than 1% juice from one or another crab apple, usually something ornamental. These dramatically changed and improved the flavor profile. My basic question is: What is the diversity of flavors from these other species and can any of them be useful in cider production? A student of mine, David Reedy, and I previously did a large taste analysis (not yet published) of fruit from various *Malus* species growing in the Geneva collections. We also sampled some of the same species elsewhere in Asia, Europe, and at a few places in the USA. Other than some of the more nasty, woody ones, we did not get consistent results.

"1. So, I have been trying to grow these in a different (from Geneva) common garden to see if we can get consistent tastes within each taxa. Most have not yet flowered. In Geneva we were limited in our time window so some trees were near the end and others near the beginning of fruiting period, whereas here I can check them one at a time as they mature. I do not yet have my lab set up to measure results but am collecting samples and freezing them so that once I can prepare extracts and push them through an HPLC, I can start to collect some markers that may correlate with the prominent tastes. At this point I am just watching trees grow and usually knocking off flowers so that they don't waste time making a very small number of fruit.

"2. So, eventually I will produce a library of markers from the various species and possibly try to produce a chemophylogeny from that data. I assume that this will be rough since the environmental activation of the genes responsible may or may not reflect the evolutionary drivers from the various locations where these plants originally evolved.

"3. At some point we will have enough materials to plant out our own full-scale orchard and I plan to set these up in blocks based on ripening time with the objective of having about 6 months of harvest time to flatten out the work curve. "As a side note, I have been growing out fruit from some root stocks to see what those taste like. BUD118 is proving to be very interesting. That is not in the list of plants from Geneva, but I would be interested in talking with others who might be doing similar messing around."

He sent me a long list of the taxa that he has in the ground. Most trees are simply too young (less than 3 years) and some will not make it to maturity "since he is a marginal farmer. Some of the collections are from a former student, Adam Brown, who lives in Pennsylvania, some are from Queener Farm here in Oregon, and others are ones I have traded with a variety of people, so the quality of the identifications varies."

**24. Brett Webber**, Webber Orchard, 1280 Beebe Lane, Eugene, OR

He requested 7 accessions of pomegranate (*Punica granatum*), 11 of various mulberry species (*Morus* spp.) and one of fig (*Ficus carica*). "Unfortunately this material was involved in last year's flood and has been lost. Sorry to not have any further information."

**25. Jasper Smith**, Native Cider LLC, Suite 102, Cascade Locks, OR

He requested scions of *Malus* spp. 'Blanquina'. The grafting was successful.

**26. Michael McNassar**, 19700 SW Seiffert Rd., Sherwood, OR

He requested scions of 23 apple accessions (*Malus domestica*) to evaluate in Sherwood, OR (Zone 8B) and in western Montana (Zone 4B-5A) and see which ones do best in each location as there is space for modest orchards in each location. Most of the grafts have taken but of course no fruit to report on as yet. He is growing them on M.26 rootstock primarily chosen for its hardiness in Montana, and also on a seedling rootstock that he found in Montana. He wants to experiment with the Montana rootstock particularly because it is obviously hardy but it also grew and is thriving in heavy clay that is flooded with standing water for 2 to 3 months each Spring. The seedling tree seems to be semi-dwarfing. He is guessing it is about 20 years old and about 10-11' tall and wide. "I hope this information is somewhat helpful to you. Please know that your work and the availability of these apple treasures are greatly appreciated by so many growers."

**27. Paul Matalucci**, Apple Core Farm, 3993 Endow Drive, Hood River, OR

One accession of apple (*Malus domestica*) was requested. "Through circumstances largely beyond our control, we were unable to arrive at our farm in Hood River for about two months after learning that scions had been shipped in Feb 2019, and by the time we retrieved them from the Post Office they were unusable for grafting. We will be careful to avoid this outcome in any future requests. Our early grafts this year were successful, and we look forward to obtaining scions next year for use. Our farm is small, and we're not conducting official academic studies."

**28. Brian Lindsay**, 28376 Pleasant Valley Rd, Sweet Home, OR

He ordered a diverse assortment of 57 woody plant accessions, including 25 apple (*Malus domestica*) and 10 pear (*Pyrus communis*). He and his wife own a 40-acre cider apple farm, of which 18 have been planted to commercial blocks so far.

The requested scions were grafted for evaluation of commercial suitability last spring. The trees are currently 3-4 ft tall, and are not yet in production. He is taking notes on vigor, susceptibility to disease, and heat tolerance.

**29. Adam Tedeschi**, 24325 NW Reeder Rd., Portland, OR

He requested scions of 18 apple (*Malus domestica*) accessions. He will evaluate antique cultivars under for no-spray cultivation. Though only in their second year, PI 590128 Golden Harvey and PI 199418 Lamb Abbey Pearmain have been two standouts in their ability to resist disease and insects.



**30. Cristiana Vallejos**, 3322 NW McKinley, Corvallis, OR 97330

Cristiana Vallejos, a former OSU Horticulture undergraduate who worked with Jim Myers in vegetable breeding, requested four accessions of bean (*Phaseolus vulgaris*) and one of barley (*Hordeum vulgare*). The accessions will be evaluated for characteristics such as yield and root nodulation under organic and dryland conditions.

**31. Beebe, Deborah**, Columbia Garden Club, 35210 SE Hurlburt Rd., Corbett, OR

She ordered *Allium fistulosum* 'Beltsville Bunching' and reports that her plants did fine. She had them in a pot so she could identify which were the ones received from W-6. She fertilized them weekly with a dilute fertilizer and they did well. She could not see any difference between these plants and the regular green onions she planted in her garden from regular seed sources.

**Publications:**

Graebner, R.C., C.R. Brown, R.E. Ingham, C.H. Hagerty, H. Mojtahedi, R. Quick, L.L. Hamlin, N. Wade, J.B. Bamberg and V. Sathuvalli. (2018) Identification of sources of resistance to *Meloidogyne chitwoodi* from wild potato species. Am. J. Potato Res. doi: 10.1007/s12230-018-9674-9

Bali, S., K. Vining, C. Gleason, H. Mojtahedi, C.R. Brown, V. Sathuvalli (2019) Differential gene expression analysis provides insights into salicylic acid mediated resistance response to *Meloidogyne chitwoodi* derived from the Mexican wild potato species *Solanum bulbocastanum*. BMC Genomics DOI:10.1186/s12864-019-6257-1

Molnar, T.J., S. Mehlenbacher, P. Engel, and J. Capik. 2019. Multiple sources of eastern filbert blight resistance provide breeding utility in New Jersey. J. Amer. Pomol. Soc. 73(3): 178-192.

Quick, R.A., L. Cimrhakl, H. Mojtahedi, V. Sathuvalli, M.J. Feldman, C.R. Brown (2020) Elimination of *Tobacco rattle virus* from viruliferous *Paratribhodorius allius* in greenhouse pot experiments through cultivation of Castle Russet. Journal of Nematology DOI: 10.21307/jofnem-2020-011