State of Montana

Annual Report for Calendar Year 2018

to the W-6 Technical Committee

Compiled by Mike Giroux

Twenty-three recipients received a total of 2394 plant germplasm accessions in Montana during the last year. 1723 of the accessions went to one private breeder with the next biggest portion (369) going to Montana State pulse breeder Kevin McPhee. We also continue to have several individuals requesting accessions of various species including tree fruit and raspberries to screen for those that may tolerate MT winters.

NPGS Site	Sent #	Species	Primary Purposes
DAV	1	grapes	Breeding cold hardiness
NE9	1	Tomatoes	Educational
NSSL	1	cereals	Varietal development
SOY	2	soybean	Varietal development
NC7	29	Corn, camelina	Varietal development
COR	30	Raspberry, apples, pears	Breeding for short season fruit varieties
S9	71	Guar, cowpea	Guar breeding, cowpea for sawfly parasitoids
GEN	72	Grapes, raspberries, apples	Home orchard breeding and demonstrations
W6	416	Pulse crops	Pulse crop breeding, genetics studies, disease
NSGC	1772	Wheat and wheat relatives	Breeding and production of "ancient grains"
Total	2395		

Recipient

- COR Douglas Forbes requested 9 accessions of raspberries and other fruits to look for coldhardiness
- COR Will Genadek requested 6 raspberry accessions to due fruit quality trials
- COR, GEN- James Sapp requested 9 apple and pear accessions to screen for their suitability in a MT orchard.
- DAV, GEN Carl Camper requested 2 grape accessions to find out if they were cold hardy in MT
- GEN Brent Sarchet (MSU) requested 56 apple accessions to test their suitability in MT and to find out what varieties make up MT apple heritage orchards.

http://www.montana.edu/news/mountainsandminds/17327/apples-to-apples

- GEN Heather Hicks requested 6 apple accessions for her home orchard breeding program.
- GEN- John Becker (wheat grower) requested 4 accessions of wheat to assess whether they were suitable for bread production
- NC7 Kevin King (MSU) requested 5 camelina accessions to see how different camelina species behave under field conditions.

- NSGC Andy Hogg (MSU) requested 1 wheat accession for a study involving wheat semi-dwarfing genes.
- NSGC Burcu Alptekin (MSU) requested 4 wheat accessions for screening for salt tolerance.
- NSGC Fernando Guillen-Portal (MSU) requested 2 oat accession to screen for drought and salt stress genes
- NSGC Jacob Cargill (Prairie Heritage Farm) requested 1723 accessions to screen for those most suited to the production of ancient grain bread. He plans to carry out an "evolutionary breeding" program. <u>http://www.prairieheritagefarm.com/the-farm</u>
- NSGC Nancy Blake (MSU) requested 2 accessions of wheat to screen for wheat stem sawfly resistance genetic markers
- NSGC, NSSL Pat Hensleigh (USDA-NRCS) received 41 wheat accessions to look for dryland agriculture adaptation.
- S9 David Weaver (MSU) requested 16 cowpea accessions to determine whether cowpea nectar would help support wheat stem sawfly parasitoids.
- S9- Bob Quinn requested 46 guar accessions as part of his screening for those that would do well on his farm. http://bobquinnorganicfarmer.com/
- S9, NE9 Shane Siegle requested 10 vegetable accessions for public education demonstrations
- SOY- Ze Tian Fang (MSU) received 2 soybean accessions to test whether they would perform well in NW MT.
- W6 John Gaskin (USDA-ARS) requested one brassica accession for a biological control study
- W6 Kelly Leflamme requested 3 weed species to examine what fungal communities are associated with them.
- W6 Kevin McPhee (MSU) requested 369 pulse crop accessions in support of his pea, lentil, and chickpea breeding programs.
- W6, COR Lash Smith requested 56 accessions of tomatoes, pea and other legumes, and apples for breeding and seed preservation.

Publications:

- Adhikari, S., Menalled, F., Weaver, D. (2018) Farming system and wheat cultivar affect infestation of, and parasitism on, Cephus cinctus in the Northern Great Plains. Pest Management Science: v. 74 i. 11 p. 2480-2487
- Blake, N. K., Varella, A. C., Bicego, B., Martin, J. M., Cook, J. P., Heo, H. -., Acharya, R., Sherman, J. D., Nash, D., Talbert, L. (2018) Maturity traits related to climate adaptation affect quality characteristics in hard red spring wheat. Crop Science: i. 58 p. 1954-1963
- Chang, H., Sang, H., Wang, J., McPhee, K. E., Zhuang, X., Porter, L., Chilvers, M. (2018) Exploring the genetics of lesion and nodal resistance in pea (Pisum sativum L.) to Sclerotinia sclerotiorum using genome-wide association studies and RNA-Seq. Plant Direct: p. 1-17
- Dyer, W., Burns, E. E., Keith, B., Talbert, L. (2018) Non-target site resistance to flucarbazone, imazamethabenz, and pinoxaden is controlled by three linked genes in Avena fatua L. . Weed Research: v. 58 p. 8-16
- Echegaray, E. R., Barbour, C. R., Talbert, L., Stougaard, R. N. (2018) Evaluation of Sitodiplosis mosellana (Diptera: Cecidomyiidae) infestation and relationship with agronomic traits in selected spring wheat cultivars in northwestern Montana, United States of America. The Canadian Entomologist: v. 150 p. 675-683
- Godoy, J., Gizaw, S., Chao, S., Blake, N., Carter, A., Cuthbert, R., Dubcovsky, J., Hucl, P., Kephart, K., ... Talbert, L. (2018) Genome-wide Association Study (GWAS) of Agronomic Traits in a

Spring Planted North American Hard Red Spring Wheat Panel. Crop Science/Crop Science Society of America: v. 58 p. 1838-1852

- Jobson, E. M., Johnston, R. E., Oiestad, A. J., Martin, J. M., Giroux, M. (2019) The wheat Rht-B1b semi-dwarfing allele reduces flag leaf photosynthetic rate and modifies seed development. Frontiers in Plant Science: v. 10 i. 51
- Jobson, E. M., Martin, J. M., Schneider, T. M., Giroux, M. (2018) The impact of the Rht-B1b, Rht-D1b, and Rht-8 wheat semi-dwarfing genes on flour milling, baking, and micronutrients. Cereal Chemistry: v. 95 p. 770-778
- Jordan, K., Wang, S., He, F., Chao, S., Lun, Y., Paux, E., Sourdille, P., Sherman, J., Akhuovna, A., ... Talbert, L., ... Akhunov, E. (2018) The genetic architecture of genome-wide recombination rate variation in allopolyploid wheat revealed by nested association mapping. The Plant Journal: v. 95 p. 1039–1054
- Sherman, J., Varella, A., Lanning, S., Martin, J., Heo, H., Nash, D., Blake, N., Cook, J., Talbert, L. (2018) Effect of a gene for high dough strength on whole wheat baking parameters of hard white spring wheat. Cereal Chemistry: v. 95 p. 411-417
- Varella, A. C., Talbert, L., Achhami, B. B., Blake, N. K., Hofland, M. L., Sherman, J., Lamb, P., Reddy, G., Weaver, D. (2018) Characterization of resistance to Cephus cinctus Norton (Hymenoptera: Cephidae) in barley germplasm. no. Journal of Economic Entomology: v. 111 i. 2 p. 923-930