2016 W6 Idaho State Report
Joseph C. Kuhl

In 2016, 5,709 accessions representing 32 genera and 73 species were requested in Idaho from the National Plant Germplasm System. Total number of accessions were slightly down from 2015 when 7,533 accessions were requested including 48 genera and 75 species, however 2016 maintained a higher numbers of accessions than requested in 2012 to 2014: 2,528 in 2014, 2,960 in 2013, and 4,221 in 2012. There were a total of 107 orders from Idaho in 2016, higher than 73 orders placed in 2015 and 80 orders in 2014. Overall this represents a 34% increase in the total number of orders compared to 2015. Orders were evenly divided among state, federal and private groups, 37, 35, and 35 orders, respectively. The major user groups (assessed by the number of accessions requested) in 2016 were USDA scientists (primarily based in Aberdeen, Idaho) (68% of total accessions) and state entities (20% of total accessions), together accounting for ~88% of the total accessions requested. University researcher requests made up the vast majority of requests from state agencies. The top two private requests were from companies, J.R. Simplot with 369 *Solanum* accessions and Monsanto, Wheat Technologies Center with 136 *Triticum* accessions. The top five genera (15%) requested in Idaho in 2016 were *Triticum* (2,909) followed by *Avena* (1,280), *Hordeum* (479), *Solanum* (451), and *Brassica* (407), together representing 97% of all accessions requested.

University of Idaho research programs utilized NPGS germplasm.
Dr. Alex Karasev (Xue Feng) requested 5 *Phaseolis* accessions and 2 *Vicia* accessions in 2016 for virus propagation and identification.

Dr. Jack Brown (Jim Davis) requested 407 *Brassica* accessions in 2016 for his *Brassica* breeding program.

Dr. Jianli Chen (Justin Wheeler) requested 613 *Triticum* accessions in 2016 for her wheat breeding program.

Dr. Louise-Marie Dandurand (Andrew MdGinnis) requested 27 *Solanum* accessions and 5 *Lupinus* accessions for evaluation as trap crops for *Globodera pallida* (pale cyst nematode).

Dr. Mark Schwarzlander (Bradley Harmon) requested a diverse set of species to evaluate efficacy of selected arthropods and pathogens to be used as biological controls.

Jenny Durrin in the nuclear seed potato program requested 1 *Solanum* accessions in 2016.

Dr. Joseph Kuhl requested 3 *Solanum* accessions (populations) to screen for resistance to *Globodera pallida* (pale cyst nematode).

Publications:

Gazave, E., E.E. Tassone, D.C. Ilut, M. Wingerson, E. Datema, H.M.A. Witsenboer, J.B. Davis, D. Grant, J.M Dyer, M.A. Jenks, J. Brown, and M.A. Gore (2016) Population genomic analysis reveals differential evolutionary histories and patterns of diversity across subgenomes and subpopulations of *Brassica napus* L. Frontiers in Plant Science. 7:article 525.

Feng, X., J. Myers, and A. Karasev (2016) Bean common mosaic virus isolate overcomes the bc-3 resistance allele in common bean: Virus genetic determinants defining a novel pathogenicity group. Phytopathology 106S: 7-8.

Germplasm user reports for 2016 requests:

I requested seed of two mapping populations, one is used for mapping of FHB resistance, another is used for mapping of yield components. The two populations are being phenotyped now and some results will be generated this summer.

Seed quality are good.

Let me know if you have additional questions.

Jianli Chen, University of Idaho

I really appreciate help we got from NSGC (National Small grain collection) to give us seed when we need it.

Actually, I received 68 wheat germplasm not 136. However, it was sent twice, that is why it became double (136). I had to request twice because my helper make planting error and I decided to get fresh seed. The seed was fine and grows well. I just use them to identify leaf and stem rust races if any in the field. I have planted it in South Texas area just to monitor disease conditions there and understand what race of rusts available during each season just to understand the genetics of our pipelines.

Thank you very much

Zewdie Abate, Monsanto, Wheat Technology Center

The germplasm I received was in good shape and all the seeds planted germinated.

I have use this material in crossing, the barley lines are being used to make some new food barley cultivars that would fit in the Idaho growing areas. The three winter wheat lines and the four spring wheat lines are being used in my breeding program to develop wheat varieties that are adaptable to the Montana region.

The National Germplasm System is an important part of the overall agricultural production system in this country and I highly support the use of my tax dollars to support this program for future generations of hungry people, both in the US and to those countries to where we export our products. The exportation of our agricultural products helps to offset the deficit our country has from importing goods from other countries.

Thank you for your efforts to document the usefulness of this germplasm

Dale Clark, Northern Seed, LLC

Seed from the National Germplasm System arrives in good shape and generally grows just fine.

We use seed from the National Germplasm System for plant breeding and research.

Thanks,

Brett Despain, ADM Seedwest Research

Attached (below) please find a general summary of the tests and evaluations we performed using the alfalfa seed varieties obtained from the NGS.

In most cases, these are Standard Check varieties for disease, pest and agronomic evaluations used in our alfalfa breeding program.

Overall, the seed seems to have good viability, though there have been some varieties with lower than desired germination.

Also for some of our more frequent evaluations (nematodes and diseases) 10 g of seed at a time is barely enough to seed the number of trays required for the year. We know that there is a limited amount of archived germplasm but hope that some of the more used varieties could be increased in the future.

Please note that this list includes seed requested by my colleague here at Nampa, Megan Perales.

I hope this helps!

Steve Hanchett, (and Megan Perales) Forage Genetics International, LLC

Forage Genetics, Intl.
Nampa, Idaho Research Station
Summary of Alfalfa Standard Check seed used in 2016 evaluations

S = Susceptible to pest; LR = Low Resistance; R = Resistant; HR = High Resistance
Number scores for Fall Dormancy are evaluated FD (1-12 scale; 1 = most dormant); 2017 FD = in current FD evaluation

Medicago variety	Comment	Anthracnose (AN)	Blue Alfalfa Aphid (BAA)	Fall Dormancy (FD)	Fusarium Wilt (FW)	Green Pea Aphid (PA)	Salt Germ	Spotted Alfalfa Aphid (SAA)	Stem Nematode (SN)	Verticillium Wilt (VW)
5246				3						
5262				2017 FD						
ABI 700				6						
Apollo									(host)	
Apollo II									(host)	
Arc		R						S		
Baker								R		
Caliverde			S					S		
Cuf 101			HR	9		HR		HR		
Dona Ana				7						
G-2852				2017 FD						
Kanza								(not used)		
Lahontan									R	
Maverick				1						

Mesa Sirsa	*poor germination*						**R**			
MnGN1					**S**					
OK 08								**(not used)**		
Ranger									**LR**	
Saranac	*good germination*	**S**								**S**
Saranac AR		**R**								
UC-1465				**11**						
UC-1887				**8.9**						
Vernema									**HR**	
WL 325HQ				**2017 FD**						
ZG 9830				**2017 FD**						

Arash and I requested seeds of the 20 wheat accessions for a greenhouse study. We are investigating different response of wheat germplasm to insect damage. The study is still undergoing, and no result or conclusion is available at this moment. So far, we only use six of the 20 accessions, and one or two of them is very low in germination.

Thank you,

Xi Lian [and Arash Rashed], University of Idaho

I will gladly give you any info you need. I did receive 30 packets of Einkorn wheat last year from the Aberdeen germ plasm center in Idaho.

The condition of seed looked good, we received packets of seed from many parts of the world that we have planted this spring, we still have some winter verities that we will plant this fall. So far we have had good germination on the majority of the seed a few from some countries are not so good but happy with results. My intended purpose is to build a seed base for a certified organic farm, that grows the ancient grains, Einkorn, Emmer, and Spelt and sell directly to the consumer or wholesale to bakeries. Trying to find seed for these ancient grains is like trying to find a needle in a haystack. I planted each packet separate from each other and have marked each packet from which country seed came from so when harvested I can keep record of harvest and yields from the different countries of origin. I plan on giving back to the Aberdeen germ plasm center some of the seed from what I harvest and any information they desire so that their

research can continue and replenish their supply for another farmer like me. I am 5th generation farmer in the Rockland ID valley. The only way to be successful these days is transition to Organic when we have only 220 acres to work. The ancient grains may be a small market but growing fast and worth the risk to transition for the premium price that it will sell for.

Mark Ralphs, Benchview Farms

Yes, we got a bunch of *Brassica juncea* accessions last year. They were delivered promptly and the packages were received in good condition. Germination was good. We're using them as part of a genetic mapping and breeding efficiency study. So far we've grown plants in the greenhouse for DNA sampling and to produce more seed for field trials, which we planted this spring. Talk with Jack for details on the project.

We have a first paper from a similar study using *Brassica napus* accessions that we did with a group of USDA scientists. Jack, do you have Elodie and Erica's paper close at hand?

Jim B. Davis, University of Idaho

Yes, I requested **2 *Vicia*** accessions and **5 *Phaseolus*** accessions orders in 2016 and used them for my research study.

Items:
1 PI 655329 - W6 - Vicia faba var. minuta
2 PI 667236 - W6 - Vicia faba var. minuta

For these two faba bean cultivars, I used them to propagate one strain of PSBMV. Although I could detect virus replicating there but faba bean is too hard to get seed in the greenhouse condition so I stopped using them for the further study. Then seed condition was good and germination rate was around 80%.

1 PI 549734 - W6 - Phaseolus vulgaris
2 PI 549668 - W6 - Phaseolus vulgaris
3 PI 549535 - W6 - Phaseolus vulgaris
4 PI 549732 - W6 - Phaseolus vulgaris
5 PI 549729 - W6 - Phaseolus vulgaris

for these bean cultivars, I used them to test the pathogenicity of different strains of BCMV. This is my main project and it is very productive by using the seeds from germplasm center. Currently we got several papers published from 2014-early 2017. The seed quality was very good and it's really great help to get all these cultivars with different genetic background from a stable source.

Hopefully this helps, let me know if you need any other information.

Best regards,

Xue Feng, University of Idaho

Indeed we did use resources from the 369 Solanum accessions inventory in 2016. I arranged shipments from Sturgeon Bay with John Bamberg. I also shared the results of our work that you see attached with John. The condition of samples received from the repository was fine. We had enough quality material to run tests and make good conclusions.

The results depict the outcome of considerable work. Although John didn't have a problem with the format of the data as presented in the attachments, you may. If you need a better written report, I will need some more time to synthesize the results.

Respectfully,

Craig Richael, Simplot Plant Sciences

All are being tested for potential as trap crops; e.g. hatch and host assays as recommended by Dr. C. Brown
All seeds appeared to be undamaged

Louise-Marie Dandurand, University of Idaho