

State of Arizona Annual Report for Calendar Year 2019
to the W-6 Technical Advisory Committee

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Summary:

In 2019, 41 requestors from Arizona received 2,826 accessions in 63 orders from the National Plant Germplasm System (NPGS). Of these recipients, most received 100 items or less (93%) while a few received over 100 items (7%). Two recipients received 603 items and 1,469 items, respectively. The majority of orders were placed for research purposes (59%) while the remaining were for educational (13%), home gardening (4%) or undisclosed purposes (24%). Research purposes included genetic studies, botanical or taxonomic investigations, plant pathological investigations, and varietal development. Materials requested for educational purposes were used in classroom instruction and for public education and demonstrations.

Recipients received 142 different species in the form of seed (94%) and other plant materials (6%). The most commonly requested genus was *Triticum* and accounted for 74% of all order items. *Brassica* (5%), *Capsicum* (4%), and *Malus* (3.5%) were the most commonly requested genera after *Triticum* (Appendix 1).

A request for feedback on the germplasm received was sent to the 40 recipients who provided a valid email address. Of these 40, ten responded with information on the quality of materials received and how they were utilized (Appendix II). All materials were received in good condition. Seven recipients had attempted to germinate or root materials at the time of reporting. Of these, five reported success, one reported success with some and the remaining recipient had no success with germination or rooting.

The recipients who provided feedback highlighted the diversity of uses of materials from the NPGS. Early elementary school students conducted experiments on sorghum that was grown from NPGS material. Not only did the materials provide a learning opportunity, the plants also stabilized soil and acted as a wildlife forage. The requestor also collected seeds so the school can increase plantings in the future (Sheets, Jacob). A commercial plant breeder, the recipient of the largest order to Arizona in 2019, will utilize NPGS material to enhance the bread wheat lines they offer. The NPGS material will also be assessed for environmental adaptations among cultivars that are exotic to Arizona (Pirseyyedi, Seyed). NPGS materials were also utilized by a private individual to improve disease resistance in tomatoes and develop new lines. The information has been made available on the private Facebook group “Tomato Breeders” where individuals can discuss tomato genetics, epigenetics, and breeding (Cass, Gary).

Publications:

No publications that included NPGS materials received in 2019 were reported from Arizona recipients.

Appendix I: Summary of Species Requests

Taxon	Quantity Received
<i>Achillea alpina</i>	1
<i>Achillea millefolium</i>	12
<i>Achnatherum hymenoides</i>	3
<i>Aleurites moluccanus</i>	1
<i>Allium altaicum</i>	8
<i>Allium angulosum</i>	2
<i>Allium cepa</i> var. <i>cepa</i>	1
<i>Allium drobovii</i>	1
<i>Allium fistulosum</i>	2
<i>Allium galanthum</i>	4
<i>Allium hymenorrhizum</i>	1
<i>Allium jodanthum</i>	1
<i>Allium lineare</i>	1
<i>Allium obliquum</i>	1
<i>Allium oschaninii</i>	2
<i>Allium pskemense</i>	2
<i>Allium saxatile</i>	1
<i>Allium scabriscapum</i>	1
<i>Allium schoenoprasum</i>	4
<i>Allium senescens</i>	2
<i>Allium splendens</i>	1
<i>Allium vavilovii</i>	3
<i>Artemisia ludoviciana</i>	8
<i>Atriplex canescens</i>	5
<i>Brassica carinata</i>	7
<i>Brassica napus</i>	41
<i>Brassica napus</i> subsp. <i>napus</i>	7
<i>Brassica oleracea</i>	1
<i>Brassica oleracea</i> var. <i>botrytis</i>	2
<i>Brassica oleracea</i> var. <i>capitata</i>	3
<i>Brassica oleracea</i> var. <i>gemmifera</i>	1
<i>Brassica oleracea</i> var. <i>italica</i>	1
<i>Brassica oleracea</i> var. <i>sabauda</i>	1
<i>Brassica oleracea</i> var. <i>viridis</i>	1
<i>Brassica rapa</i>	30
<i>Brassica rapa</i> subsp. <i>chinensis</i>	3
<i>Brassica rapa</i> subsp. <i>dichotoma</i>	3
<i>Brassica rapa</i> subsp. <i>pekinensis</i>	1
<i>Brassica rapa</i> subsp. <i>rapa</i>	1
<i>Brassica rapa</i> subsp. <i>trilocularis</i>	6

<i>Brassica tournefortii</i>	24
<i>Capsicum annuum</i>	3
<i>Capsicum baccatum</i>	7
<i>Capsicum baccatum</i> var. <i>pendulum</i>	29
<i>Capsicum chinense</i>	81
<i>Ceiba pentandra</i>	1
<i>Cereus hildmannianus</i>	1
<i>Chylismia claviformis</i> subsp. <i>aurantiaca</i>	4
<i>Chylismia claviformis</i> subsp. <i>claviformis</i>	4
<i>Cinnamomum verum</i>	1
<i>Citrullus amarus</i>	18
<i>Citrullus colocynthis</i>	3
<i>Citrullus lanatus</i>	23
<i>Citrullus mucosospermus</i>	5
<i>Citrus japonica</i>	2
<i>Citrus</i> x <i>aurantiifolia</i>	1
<i>Citrus</i> x <i>aurantium</i>	3
<i>Citrus</i> x <i>limon</i> (L.) Osbeck	2
<i>Cola acuminata</i>	1
<i>Couroupita guianensis</i>	1
<i>Cyamopsis tetragonoloba</i>	1
<i>Dianthus plumarius</i>	1
<i>Diospyros kaki</i>	4
<i>Dovyalis caffra</i>	1
<i>Elaeis guineensis</i>	1
<i>Eriogonum inflatum</i>	5
<i>Fragaria chiloensis</i> f. <i>patagonica</i>	2
<i>Fragaria vesca</i> subsp. <i>vesca</i>	1
<i>Fragaria virginiana</i> subsp. <i>virginiana</i>	3
<i>Fragaria</i> x <i>ananassa</i>	6
<i>Helianthus annuus</i>	16
<i>Hesperostipa comata</i>	5
<i>Hevea brasiliensis</i>	1
<i>Ipomoea quamoclit</i>	1
<i>Lactuca sativa</i>	19
<i>Licania platypus</i>	1
<i>Licania rigida</i>	1
<i>Limonium sinuatum</i>	1
<i>Litchi chinensis</i>	2
<i>Lupinus leucophyllus</i>	1
<i>Malus domestica</i>	82
<i>Malus hupehensis</i>	1
<i>Malus hybr.</i>	9

<i>Malus prunifolia</i>	1
<i>Malus pumila</i> Mill.	3
<i>Malus sieversii</i>	5
<i>Malus</i> spp.	1
<i>Malus toringoides</i>	2
<i>Malus</i> x <i>asiatica</i>	1
<i>Manilkara bidentata</i>	1
<i>Manilkara zapota</i>	1
<i>Mentzelia albicaulis</i>	7
<i>Oenothera pallida</i>	4
<i>Olea europaea</i>	3
<i>Opuntia ellisiana</i>	1
<i>Opuntia ficus-indica</i>	3
<i>Opuntia</i> hybr.	3
<i>Opuntia</i> spp.	1
<i>Opuntia streptacantha</i>	1
<i>Pachira aquatica</i>	1
<i>Peritoma lutea</i>	5
<i>Persea americana</i>	1
<i>Phacelia crenulata</i>	4
<i>Phacelia fremontii</i>	1
<i>Phaseolus vulgaris</i>	3
<i>Pistacia vera</i>	5
<i>Pouteria campechiana</i>	1
<i>Pouteria sapota</i>	1
<i>Prunus avium</i>	1
<i>Psidium guajava</i>	2
<i>Pterocarpus indicus</i>	1
<i>Rhus aromatica</i> var. <i>trilobata</i>	22
<i>Rubus</i> hybr.	1
<i>Sapindus saponaria</i> var. <i>drummondii</i>	1
<i>Solanum arcanum</i>	1
<i>Solanum chilense</i>	1
<i>Solanum habrochaites</i>	4
<i>Solanum lycopersicum</i>	7
<i>Solanum neorickii</i>	2
<i>Solanum peruvianum</i>	1
<i>Solanum pimpinellifolium</i>	1
<i>Solanum</i> subsect. <i>lycopersicon</i> hybr.	4
<i>Solanum tuberosum</i>	1
<i>Solanum tuberosum</i> subsp. <i>andigenum</i>	1
<i>Sorghum bicolor</i> subsp. <i>bicolor</i>	17
<i>Spinacia oleracea</i>	6

<i>Sporobolus cryptandrus</i>	4
<i>Stanleya pinnata</i>	5
<i>Stephanomeria exigua</i>	4
<i>Streptanthus longirostris</i>	5
<i>Theobroma cacao</i>	4
<i>Theobroma grandiflorum</i>	1
<i>Thespesia grandiflora</i>	1
<i>Triticum aestivum</i> subsp. <i>aestivum</i>	1477
<i>Triticum aestivum</i> subsp. <i>compactum</i>	1
<i>Triticum aestivum</i> subsp. <i>spelta</i>	200
<i>Triticum turgidum</i> subsp. <i>dicoccoides</i>	1
<i>Triticum turgidum</i> subsp. <i>dicoccon</i>	1
<i>Triticum turgidum</i> subsp. <i>durum</i>	423
<i>Triticum turgidum</i> subsp. <i>polonicum</i>	1
<i>Triticum turgidum</i> subsp. <i>turanicum</i>	1
<i>Zea mays</i> subsp. <i>mays</i>	7

Appendix II: Summary of Responses

Barker, Michael, University of Arizona; received 27 *Brassica* accessions for genetic studies.

Cass, Gary, No affiliation; received 21 *Solanum* accessions for varietal development and taxonomic studies. Material arrived in good condition and was successfully germinated. Material was used to make crosses “as part of a project to improve the disease resistance of tomatoes, and to develop new lines based on wild species.” No publications have been produced however, further information can be found in the private Facebook group “Tomato Breeders.”

Cavalle, Michael, No affiliation; received one accession of *Ipomoea quamoclit* for botanical or taxonomic investigations. Material arrived in good condition. Previously received materials have germinated successfully.

Nickerson, Jon, Greengo Seed; received six accessions of *Lactuca sativa* for varietal development. Two of the successions successfully survived for a Fusarium wilt trial. More information is available upon request or in a future report.

Pirsevedi, Seyed, Arizona Plant Breeders; received 1,469 accessions of *Triticum aestivum* subsp. *aestivum*. Material arrived in good condition and most germinated. At the time of reporting 460 lines had been planted. Material will be used for germplasm enhancement and eventually crossed with other lines to develop new material. Exotic cultivars are being tested for environmental adaptations to Arizona growing environments.

Rouston, Kanin Josif, No affiliation; received seven *Malus* accessions. Cuttings arrived in good condition and are expected to graft well. Material will be used to find apple and pear trees that are adapted to a high desert growing environment. Additionally, “Climate resilient traits, if present in the germplasm received, may lead to future cultivars adapted for growing in conditions of increased climatic variability.”

Sheets, Jacob, Roadrunner Elementary School; received two accessions of *Sorghum bicolor* subsp. *bicolor* for classroom instruction purposes. Material arrived in good condition and germinated successful. Material was used to stabilize soil in areas where soil runoff and migration were occurring. Additionally, the material was used to provide scientific experiment opportunities for kindergarten and first grade students, as well as forage and habitat for wildlife. Seed was collected to increase the size of plantings in future years.

Smith, Chris, No affiliation; received eight *Fragaria* accessions for home gardening. Material arrived in good condition. None of the material rooted successfully.

Synder, Lucy, USDA-ARS; received 99 *Brassica* accessions for entomological investigations. Material arrived in good condition and almost all accessions germinated and rooted well. Material was first used in a trial planting before a research study that will be conducted in the summer of 2020. Material will be used to assess the fatty acid content of pollen “with the intent of making recommendations to growers for cultivars with a high nutritional benefit to honey bees.”

Tokairin, Yasushi, American Takii Inc.; received 91 *Allium*, *Spinacia*, and *Citrullus* accessions for plant pathological investigations and one accession of *Allium cepa* var. *cepa* for genetic studies. Material arrived in good condition. Material had not been germinated or planted at time of reporting.