Peppers, *Capsicum* spp, comprise an important spice and vegetable in the US diet. In 2015, bell peppers were planted on 44,800 acres and yielded 16,478,000 cwt with a value of $806,115,000. Also in 2015, chile peppers were planted on 19,400 acres and yielded 4,034,000 cwt with a value of $135,743,000 (www.nass.usda.gov). During the past five years production, acres planted and yields have remained generally stable. Production value has increased annually, except for a significant decrease for chile peppers in 2015.

Inventory and regeneration summary:
The total inventory (per GRIN) of *Capsicum* is approximately 4,941 accessions. Of these, 3,407 (~69%) are *C. annuum*, 481 (~9.7%) are *C. chinense*, 386 (~7.8%) are *C. baccatum*, 282 (~5.7%) are *C. frutescens*, 75 (~1.5%) are *C. pubescens* and 20 (~ 0.4%) are *C. chacoense*. The remaining 290 accessions (~6.0%) represent related species and mixtures of one or more species that are typically noted in the inventory as *Capsicum* spp.

While 223 new accessions were received in 2011, only 22 accessions have been received since. Efforts to expand the collection should be a high priority. Notably, the community has prioritized the acquisition of *Capsicum annuum* var. *glabriusculum* as a source of novel disease resistances and the preservation of mutant stocks with special mention of those currently maintained by Gabor Csillery. Accessions representing modern germplasm would also enhance public research by allowing university scientists access to contemporary elite backgrounds for their studies. Company donation of inbreds lines in the public collection should be pursued as well as other potential sources of similar accessions. It is unclear whom would lead exploration efforts, however obtaining germplasm from other researchers may be an initial starting point.

Characterization Priorities
In 2017, a survey of the US pepper community was conducted to align germplasm priorities with community needs. (See Appendix) The following are the top rated concerns identified in the survey and further prioritized by the co-chairs, within topical areas, where characterizing NPGS germplasm would hold promise to add to the repertoire of alleles.

<u>Pathogen priorities</u>

1. Bacterial leaf spot resistance – Bacterial leaf spot (*Xanthomonas campestris* pv. *vesicatoria*) is one of the most damaging diseases on pepper especially in the Eastern US. Chemical controls are limited and genetic resistance has been a focus of many research and breeding efforts. While many genes have been deployed for resistance to various emerging races of this pathogen, history leads us to believe more will continue to be needed in the future.

2. Gemini virus resistance – (Pepper Golden Mosaic Complex: Pepper huasteco yellow vein virus (PHYVV) [synonym: Pepper huasteco virus (PHV)]. Sinaloa tomato leaf curl virus (STLCV) and additional uncharacterized begomoviruses) Gemini viruses are an emerging concern that is certainly a priority in Central American pepper production. As these challenges spread, it is anticipated that they will become an emerging threat to production in the southern US. To stay ahead of these viruses, screens to identify

resistances to the pathogen, as well as to their whitefly vectors, are a key priority for research.

3. Tomato spotted wilt virus resistance – Tomato spotted wilt virus (TSWV), and its thrips vector, was also noted as a priority for the additional identification of resistance to a broader range of virus strains.

Insect resistance priorities

1. Pepper weevil – Pepper weevil (*Anthonomus eugenii)* is an emerging source of losses of fruit and seed for seed production in Florida.

2. Aphid – Aphids (*Myzus persicae* and other genera) are a continued challenge for pepper production for losses related to feeding damage and to a lesser extent vectoring of viruses

3. Whitefly (*Bemisia tabaci* and other genera) and thrips (*Frankliniella occidentalis* and other genera) are priorities associated with their vectored pathogens.

Abiotic stress tolerance priorities

Fruit set under high temperature conditions and to a somewhat lesser extent fruit set under low temperatures is a needed attribute for further development that will allow expanded production in the US and yield stability under fluctuating temperatures.

Production traits

Mechanical harvesting was noted as a priority in our survey. For food security and labor needs, continued investment in plant traits that would facilitate mechanical harvesting should also be considered.

Capsicum germplasm committee co-chairs

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Appendix: Survey Data

In February 2017 we conducted a survey of the pepper community and asked them to rate the following issues from 1 (not important at all) to 5 (very important).

Stakeholder Information

Answer Options	Response Percent	Response Count
Academic Researcher	15.2%	5
USDA Researcher	6.1%	2
Extension	6.1%	2
Seed Company	39.4%	13
Grower	15.2%	5
Packer/Shipper	0.0%	0
Crop Protection Company	9.1%	3
Processor	0.0%	0
Other	9.1%	3
answered question		33
skipped question		0

Please rate importance of the following:	Rated Very and Fairly Important	Rating Average
Phytophthora capsici	84%	4.48
Bacterial spot Xanthomonas euvesicatoria	77%	4.37
Nematode Meloidogyne spp.	80%	4.17
Tomato spotted wilt virus (TSWV)	73%	4.00
High temp. fruit set	67%	3.89
Pepper Weevil	66%	3.86
Color-Mature	58%	3.85
Gemini Viruses Pepper Golden Mosaic Complex: Pepper huasteco yellow vein virus (PHYVV) [synonym: Pepper huasteco virus (PHV)]. Sinaloa tomato leaf curl virus (STLCV) and additional uncharacterized begomoviruses	52%	3.79
Powdery Mildew Leveillula taurica	53%	3.67
Low temp. fruit set	52%	3.63
Flavor Components	52%	3.59
Fruit Silvering	50%	3.58
Mechanical Harvesting	48%	3.52
Nutrition	44%	3.44
Earliness	41%	3.37
Anthracnose Colletotrichum spp.	50%	3.33
Cucumber Mosaic Virus	47%	3.33
Aphid	43%	3.33
Sweet potato whitefly (Bemisia tabaci), Silverleaf whitefly (B. argentifolii)	37%	3.30
Color-Immature	33%	3.26
Flowering	38%	3.25
Fusarium oxysporum f. sp. Capsici	33%	3.20
Fruit Stip	33%	3.19
Male Sterility	35%	3.15
Peanut bud necrosis virus (PBNV) (synonym: Groundnut bud necrosis virus)	31%	3.07
Brix-Soluble Solids-Sugars	37%	3.07
Bacterial Wilt Ralstonia solanacearum	40%	3.00
Carotenoid Content	31%	3.00
Salt Tolerance	27%	3.00
Water use efficiency	29%	2.96
Tobacco Etch Virus	17%	2.87

Verticillium dahlia	28%	2.83
Beet curly top virus (BCTV)	17%	2.83
Internal Fruit Rot Fusarium	27%	2.80
Syringae Seedling Blight & Leaf Spot Pseudomonas syringae pv. syringae	27%	2.80
Leaf Miner	20%	2.70
Low soil temp. germination	11%	2.56
Bacterial Canker Clavibacter michiganensis subsp. michiganens	20%	2.47
Gray Mold Botrytis cinerea	13%	2.43
Sympodial	12%	2.42