

Seed Central VegR&D Forum

Online survey overview

May 2015

In April, 2014, Seed Central's Veg R&D Forum brought together vegetable seed companies with research for the North American markets and identified 9 areas of pre-competitive research of importance to many of them:

1. Genetics of germination and vigor.
2. Evaluate effects of climate change on seed production.
3. Control of seed-borne diseases.
4. Understand seed coat permeability.
5. Develop criteria for breeding for seed quality.
6. Develop high-throughput phenotyping methods appropriate for vegetable crops.
7. Breed vegetable crops that can perform better with respect to global warming stresses.
8. Technologies to accelerate breeding processes.
9. Identify breeding markers for new and diverse selectable traits.

The person in your company who will complete **the online survey** should contact Kathy Esparza klesparza@ucdavis.edu who will provide a personalized link to the survey.

We have set up an online survey to establish priorities amongst these areas. For each of the 9 research areas, the survey lists several possible research projects, as follows:

Area 1: Genetics of germination and vigor.

- What genes are responsible for vigor?
- Are there homologous genes across species that determine germination rates and vigor?
- Why are some seeds lots more vigorous than others?
- How can seed/seedling vigor be measured?
- How does the environment during seed development affect seed quality?

Area 2: Evaluate effects of climate change on seed production.

- What will be the effects of climate change on seed production and quality?
- Are there genes that can be used as environmental sensors?
- Are epigenetics, methylation or maternal effects involved in seed quality?
- Can genetics and epigenetics be manipulated to improve seed quality in response to climate changes?

Area 3: Control of seed-borne diseases

- Would pooled research on pathogens that infect multiple crops be beneficial?
- Are the virulence and defense mechanisms similar in diverse crops?
- How can the seed industry identify and pool information about newly emerging diseases?
- Do similar environmental factors affect diseases across crops?

Area 4: Understand seed coat permeability

- How can treatments affecting seed permeability be advanced in crops with environmental and/or genetic limitations?
- How durable is seed coat permeability in multiple storage regimes?

Area 5: Develop criteria and tools for breeding for seed quality.

- What are key seed quality characteristics that can be bred for?
- How can seed quality traits be phenotyped efficiently?

Area 6: Develop high-throughput phenotyping methods appropriate for vegetable crops.

- What technologies can be developed to easily assess fruit load, disease severity, yield and other characteristics in a high-throughput non-destructive manner?
- How can genomic/marker information be integrated with high-throughput phenotyping?
- Are there new and automated analytical tools for phenotyping fruit?
- How can fruit phenotyping prior to harvest be advanced?

Area 7: Breed vegetable crops that can perform better with respect to global warming stresses.

- What plant-environment interactions are important for crop quality?
- Is adaptability/plasticity itself a complex trait that can be evaluated?
- What are the roles of industry for promoting food security during climate change?

Area 8: Technologies to accelerate breeding processes.

- Do the doubled haploid and embryo rescue technologies increase the rate of production of new varieties across species?
- Can new mutagenized populations be developed for breeding diverse vegetable crops?

Area 9: Identify breeding markers for new and diverse selectable traits.

- What are good genetic markers for seed vigor and do they apply in, for example, drought conditions?
- How appropriate are markers for fruit quality in drought conditions?

In the online survey, we ask you to indicate for each of these research projects whether it is:

- very interesting
- interesting
- not interesting

Your input will be kept confidential.

On the basis of the overall rankings, we will propose to set up some research consortia.

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