21 students responded

1. Kylie Scott-Texas
2. Kyle Parker-Texas
3. Pooja Kadian-North Dakota
4. Selena Lopez-Colorado
5. Jared Lile-Montana
6. Sydney Graham-Nebraska
7. Mei Ling Wong-Montana
8. Lucas Munaro-Illinois
9. Rishap Dahakal-Wisconsin
10. Dwight Davidson-Kansas
11. Morgan Hasler-Washington
12. Pabitra Joshi-Idaho
13. Andrew Herr-Washington
14. Daniela Miller-North Carolina
15. Timothy Mulderrig-New York
16. Yuzhou (Bruce) Xu-Kansas
17. Nico Lara-North Carolina
18. Sunilda Frias-Virginia
19. Ismaila Olaiyi-Indiana (Purdue)
20. Nanthica Krueger-Minnesota
21. Peter Schmuker-Washington

Q1. How confident are you in the following knowledge areas?

	Not at all	Somewhat	Moderately	Very
Genetics (mendelian, quantitative, population, molecular)	0	4	13	4
Genomics	2	7	8	4
Experimental design and statistics	2	6	9	4
Data management (collection, analysis, database)	1	5	11	4
Bioinformatics	7	7	5	2
Factors in crop plants that impact productivity	1	5	8	7
Selection theory and techniques	2	10	6	3
Methods for breeding in selfing and outcrossing systems	1	10	7	3
Plant breeding strategies (traditional, molecular, physiological)	2	7	9	3
Teaching strategies (Inquiry-based learning approaches)	11	6	3	1
Genomic selection (experiment set up, analysis)	7	7	5	2
UAS-HTP (operating equipment, experiment set up, data analysis)	9	5	1	6

Q2. Are there any other knowledge areas in plant breeding you feel are important?

- Experimental design based on budgets. What realistically you can accomplish as a breeder with certain funding brackets.
- How to connect with industry to develop new market class specific products.
- Maybe economics and variety protection.
- Genome assembly and pangenomics
- gene editing and transgenics

Q3. What are three knowledge areas you feel most confident in?

Genetics (mendelian, quantitative, population, molecular)	11
Genomics	4
Experimental design and statistics	7
Data management (collection, analysis, database)	6
Bioinformatics	5
Factors in crop plants that impact productivity	6
Selection theory and techniques	3
Methods for breeding in selfing and outcrossing systems	3
Plant breeding strategies (traditional, molecular, physiological)	6
Teaching strategies (Inquiry-based learning approaches)	2
Genomic selection (experiment set up, analysis)	4
UAS-HTP (operating equipment, experiment set up, data analysis)	7
Other (please specify)	

Q4. How confident do you feel in the following skill sets?

	Not at all	Somewhat	Moderately	Very
Work cooperatively	0	1	4	16
Design experiments	3	5	8	5
Define and solve problems	0	4	14	3
Manage data	0	4	13	4
Consider alternative hypotheses	2	5	11	3
Communicate your scientific ideas orally	0	7	12	2
Make phenotypic selections	2	5	8	6
Molecular techniques	7	7	5	2
UAV-HTP techniques	8	5	3	5
Genomic selection techniques	7	7	5	2
Observe and interpret results	1	3	13	4
Make marker assisted selections	8	1	9	3
Utilize SNPs or genotype by sequencing (GBS)	8	2	6	5
Statistical analysis	1	9	7	4
Choose parents and make crosses	2	9	6	4
Make genome wide selections	6	9	5	1
Write scientific papers and grants	7	9	5	0

Q5. Are there any other skill sets you feel are important in your field of study?

- presentation skills; Data Analytics; R Script

Q6. What are the three skill sets you feel most confident in?

Work cooperatively	15
Design experiments	4
Define and solve problems	7
Manage data	2
Consider alternative hypotheses	1
Communicate your scientific ideas orally	5
Make phenotypic selections	6
Molecular techniques	2
UAV-HTP techniques	5
Genomic selection techniques	3
Observe and interpret results	1
Make marker assisted selections	2
Utilize SNPs or genotype by sequencing (GBS)	3
Statistical analysis	3
Choose parents and make crosses	2
Make genome wide selections	1
Write scientific papers and grants	1
Other (please specify)	

Q7. What percentage of your time did you use the following skill sets in the past year?

	0-25%	25-50%	50-75%	75-100%
Work cooperatively	5	4	7	5
Design experiments	9	6	4	2
Define and solve problems	5	2	9	5
Manage data	3	3	12	3
Consider alternative hypotheses	7	8	5	1
Communicate your scientific ideas orally	12	3	6	0
Make phenotypic selections	11	4	5	1
Molecular techniques	14	4	3	0
UAV-HTP techniques	11	3	4	3
Genomic selection techniques	10	9	1	1
Observe and interpret results	5	5	7	4
Make marker assisted selections	13	6	1	1
Utilize SNPs or genotype by sequencing (GBS)	10	3	5	3
Statistical analysis	4	6	8	3
Choose parents and make crosses	12	6	3	0
Write scientific papers or grants	9	6	6	0
Make genome wide selections	16	4	0	1

Q8. How important do you believe the following methods are in educating graduate students?

	Not at all	Somewhat	Moderately	Very
One-on-one mentoring	0	1	5	15
Collaboration with faculty other than your advisor	0	3	11	7
Collaboration with other graduate students at your institution	0	4	10	7
Collaboration with graduate students from OTHER institutions	0	8	9	4
Teaching experience	1	9	8	3
Independent development of hypothesis	1	8	6	6
Independent development of research designs	1	8	7	5
Field experience	0	2	7	12
Laboratory experience	0	8	7	6
Exposure to diverse research methods and tools	0	3	6	12
Experience writing grants	2	4	7	8
Experience presenting results (meetings, papers)	2	0	7	12
Exposure to plant breeding students from different ethnic backgrounds	2	3	9	7

Q9. In your opinion, what are the three best methods for educating graduate students?

One-on-one mentoring	18
Collaboration with faculty other than your advisor	4
Collaboration with other graduate students at your institution	7
Collaboration with graduate students from OTHER institutions	4
Teaching experience	3
Independent development of hypothesis	2
Independent development of research designs	4
Field experience	6
Laboratory experience	4
Exposure to diverse research methods and tools	8
Experience writing grants	1
Experience presenting results (meetings, papers)	3
Exposure to plant breeding students from different ethnic backgrounds	1
Other (please specify)	1

This comment is more in regards to Q10 & Q11: I have become less motivated to pursue a career in plant breeding not from lack of interest but because I am a female with disabilities and frankly the job prospects looked too slim for me; the bioinformatics field seemed much more likely to hire someone like me.

Q10. To what extend are you interested in the plant breeding field? (0 to 10 scale)

1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	1	0	5	5	10

Q11. How motivated do you feel in pursuing a career in plant breeding? (0 to 10 scale)

1	2	3	4	5	6	7	8	9	10
0	0	1	0	1	1	2	4	5	7

Q12. Please indicate the percentage of time you participated in the following activities over the past year

	0-25%	25-50%	50-75%	75-100%
Mentoring an undergraduate student	11	8	2	0
Inquiry-based learning approached	4	9	7	1
Planning research	3	6	8	4
Working in the field	1	9	7	4
Conducting research	2	1	11	7
Being mentored by your advisor	4	10	5	2
Participating in the online community	11	7	3	0
Gathering, analyzing, and managing data	2	4	8	7
Problem solving	2	5	10	4

Q13. Please indicate the value of these activities for understanding the profession of plant breeding

	Not at all	Somewhat	Moderately	Very
Mentoring an undergraduate student	3	7	11	0
Inquiry-based learning approached	0	5	13	3
Planning research	0	1	6	14
Working in the field	0	2	5	14
Conducting research	0	1	6	14
Being mentored by your advisor	0	4	9	8
Participating in the online community	4	9	8	0
Gathering, analyzing, and managing data	0	1	5	15
Problem solving	0	2	4	15

Q14. Please indicate how often you have interacted with the following types of people in the past year.

	Never	Once a year or less	Once every three months or less	Once a month or less	Once a week or less	More than once a week
Other undergraduates at my institution	2	3	3	3	5	5
Students in my lab	0	0	0	0	3	18
Other graduate students at my institution	1	0	0	4	6	10
Students from other institutions in the US	2	3	6	6	3	1
Students from minority serving institutions	3	4	6	6	0	2
Students from institutions outside the US	7	4	5	2	1	2
My advisor	0	0	1	1	5	14
Researchers at my institution	1	2	0	5	9	4
Researchers from minority serving institutions	7	3	6	2	3	0
Researchers from other institutions in the US	5	1	9	4	2	0
Researchers outside of the US	7	7	3	2	2	0
Researchers from businesses and/or private companies	10	6	2	2	1	0

Q15. Please indicate what was the most prevalent topic of your interactions with your contemporaries?

	Class assignments/ classes in general	Trouble shooting research	Collaborations (i.e. working on a research project)	Social	Mentoring/ being mentored	Interpreting research results	Theory of genetics or breeding	Job prospects and professional networking	Other
My mentee	5	3	3	1	5	2	0	0	2
Students in my lab	3	4	10	3	0	1	0	0	0
Other graduate students at my institution	7	5	3	6	0	0	0	0	0
Students from other institutions in the US	0	5	6	7	0	0	0	1	2
Students from minority serving institutions	3	3	4	7	0	0	0	1	3
Students from institutions outside the US	0	5	1	10	0	0	0	0	5
My advisor	0	6	5	0	6	3	1	0	0
Researchers at my institution	1	6	4	4	2	1	1	0	2
Researchers from minority serving institutions	1	5	3	5	1	1	2	0	3
Researchers from other institutions in the US	1	4	4	5	0	2	1	1	3
Researchers outside of the US	1	5	2	8	0	2	0	0	3
Researchers from businesses and/or private companies	1	2	3	5	1	1	0	5	3

Q16. What is your gender?

Male	10
Female	10
Prefer Not To Answer	1

Q17. Are you a US citizen?

Yes	14
No	7

Q18. Is English your primary language?

Yes	14
No	7

Q19. How many years have you been funded as a graduate student by the WheatCAP grant?

Less than 1 year: 7

1 year: 9

2 years: 2

3 years: 1

4 years: 0

5 years: 1

Q20. How can we improve the WheatCAP education program?

- Continue to offer online resources and workshops to help students better understand their field as well as learn how to solve problems that may arise in their research projects.
- Collaborative activities outside of our research. Not a project but maybe fun prompts like "Where do you see food security in 100 years and the role of plant breeding".
- By interacting with other students and sharing the knowledge i know to them and how we work to solve a problem.
- Keep pushing advisors/researchers to mentor and teach graduate students!
- I am excited for opportunities to meet other graduate students
- Greater focus on utilizing whole genome assembly resources
- Train students to apply for grants.
- I may answer it accurately later.
- Providing more workshops
- More training sessions

Q21. Suggestions for future education activities?

- Bring in reps of CIMMYT, other companies/organizations that are potential employers so we can be set up for future job opportunities!
- Workshops on different topics such as writing grant proposals, GS, HTP, breeding methods, and so one.
- Inviting speakers from CIMMYT, John Innes, CSIRO or others could give new perspective to students.
- Fun prompts in breakout rooms almost like a panel so we can hear from different students.
- Seminar every week where one student give a presentation about his research work
- Wheat quality, and the different market classes across the US
- once a month journal club
- More training workshop.
- not now
- see Q20