

Yoon Jeong Jang, Ph.D.

Strawberry Molecular Genetics & Genomics
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Education

2015 – 2020

Ph.D. Dept. of Integrative Plant Science, Chung-Ang University, Republic of Korea

2013 - 2014

M.S. Dept. of Integrative Plant Science, Chung-Ang University, Republic of Korea

2009 - 2012

B.S. Dept. of Plant and Food Science, Sang-Myung University, Republic of Korea

Thesis

Ph.D. thesis title: Establishment of a reference genome using third generation sequencing and its application for deciphering anthracnose resistance in watermelon (*Citrullus* spp.)

M.S. thesis title: Construction of High-Dense Genetic Map and QTL Analysis of Seed Size in Watermelon (*Citrullus lanatus*)

B.S. thesis title: Effects of 2,4-D Concentration on Callus Induction from Immature Embryos in 'Mibaek' *Zea mays* L.

Positions and employment

Present

Post-doctoral fellow, full-time researcher
Strawberry Molecular Genetics & Genomics
U. of Florida/IFAS/Gulf Coast REC
Advisor: Prof. Seonghee Lee

2020 – 2021.08

Post-doctoral fellow, full-time researcher
Dept. of Plant Science and Technology, Chung-Ang University,
Republic of Korea.
Advisor: Prof. Gung Pyo Lee

Publications

1. **YJ Jang***, TY Sim, JS Ryu, SJ Rhee, YJ Kim, Lee GP, 2021 Identification of a Candidate Locus and Development of a Molecular Marker for Male Sterility in Watermelon. *Hortic. Sci. Technol.* 39(5):000-000, Aug 30,2021 Accepted
2. OK Kwon, AR Jeong, YJ Jeong, YA Kim, JY Shim, **YJ Jang**, GP Lee, CJ Park, 2021, Incidence of *Alternaria* Species Associated with Watermelon Leaf Blight in Korea. *Plant Pathol. J.* 37(4) : 329-338.
3. **YJ Jang***, HS Yun, SJ Rhee, MS Seo, YJ Kim, Lee GP, 2020, Exploring molecular markers and candidate gene responsible for watermelon dwarfism. *Hortic. Environ. Biotechnol.* 61:173-182.
4. **YJ Jang***, **MS Seo***, Hersh CP, Rhee S, Kim Y, Lee GP, 2019, An evolutionarily conserved non-synonymous SNP in a leucine-rich repeat domain determines anthracnose resistance in watermelon. *Theor Appl Genet*, 132 (2) :473–488.
5. SJ Rhee, **YJ Jang**, and GP Lee, 2018, Identification of Tousel-like kinase gene function by cucumber mosaic virus vector in tomato, *Hortic. Environ. Biotechnol.* 59 (1): 105-144
6. SJ Rhee, TH Kwon, MS Seo, **YJ Jang** and GP Lee, 2017, De novo-based transcriptome profiling of male sterile and fertile watermelon lines (*Citrullus lanatus*), *Plos One*, 12(11), e0187147.
7. BK Han, S Rhee, **YJ Jang**, TY Sim, YJ Kim, TS Park, and GP Lee, 2016, Identification of a causal pathogen of watermelon powdery mildew in Korea and development of a genetic linkage marker for resistance in watermelon (*Citrullus lanatus*). *Korean J. Hortic. Sci. Technol.*, 34(6):912-923.
8. SJ Rhee, **YJ Jang**, GP Lee, 2016. Identification of the subgenomic promoter of the coat protein gene of *Cucumber fruit mottle mosaic virus* and development of a heterologous expression vector. *Arch Virol.* 161(6):1527-1538.
9. SJ Rhee, MS Seo, **YJ Jang**, GP Lee. 2015. Transcriptome profiling of differentially expressed genes in floral buds and flowers of male sterile and fertile lines in watermelon. *BMC genomics.* 16:914.
10. SJ Rhee, B Han, **YJ Jang**, TY Sim, GP Lee. 2015. Construction of a genetic linkage map by using a frame set of simple sequence repeats and high-resolution melt markers for watermelon (*Citrullus* spp.). *Hortic. Environ. Biotechnol.* 56 (5): 669-676.

Research projects participated

1. 2019.01.01~2023.12.31: Development of mass assessment system on useful traits in the major Cucurbitaceae germplasm.
2. 2017.01.01~2021.12.31: Development of molecular breeding system for the traits of multiple-pathogen resistance, female flowering, and seed color in

- watermelon.
3. 2013.03.01~2020.12.31: Administration of risk assessment agency for LMO.
 4. 2019.01.01~2019.12.31: Molecular and biological risk assessment of transgenic rice produced by genome editing technique.
 5. 2017.04.21~2020.12.31: Development of next generation technology to variety identification and it's commercialization for fostering the seed industry.
 6. 2018.01.01~2018.12.31: Development of technical fundamentals for the risk assessment of transgenic gene-edited plants.
 7. 2017.01.01~2017.12.31: Management of LMO risk assessments institutes.
 8. 2015.01.01~2016.12.31: Development of next generation sequencing method for the risk assessment of transgenic rice event.
 9. 2013.07.25~2016.12.31: Supporting system development of molecular breeding and germplasm collection for watermelon seeds export.
 10. 2011.9.23~2015.4.30: Development of molecular markers for seed size and powdery mildew resistance and construction of genetic linkage map.
 11. 2013.03.01~2014.12.31: Stability assessment of introduced gene in GM crops.
 12. 2013.03.01~2013.12.31: Molecular and biological risk assessment of GM tomato produced by RNAi techniques.

Mentoring Experience

Since I entered the Ph.D. course, I have been the student leader of our lab, so I have mentored my juniors and solved their trouble shootings under my PI's guidance (12 students including undergraduate, master course, and doctoral course students).

Technical Skills and Competences

- **Conventional Molecular Cloning Experience:** Anti-sense and RNAi methods, cDNA preparation, gene construct preparation
- **Transgenic Plants:** Construction of Agrobacterium-mediated antibiotics-resistant plants including tomato, watermelon
- **DNA Work:** Southern blot, Genome walking by primer extension, Traditional molecular marker development, Genotyping with new technology molecular marker (HRM, KASP), Fluidigm genotyping (JUNO96.96 platform), Flow cytometry
- **RNA Work:** Northern Blot, RT-qPCR
- **Protein Work:** SDS-PAGE, Western blot, ELISA
- **Plant RNA Virus:** Isolation, propagation, and detection

- **Virus induced gene silencing (VIGS):** application of VIGS vectors based on TRV, TMV, and CFMMV
- **Plant Pathogen (Identification, Preparation and Inoculation):** Powdery mildew (*Podospora xanthii*), Anthracnose (*Colletotrichum orbiculare*), Fusarium wilt (*Fusarium oxysporum* f.sp. *niveum*), Gummy stem blight (*Didymella bryoniae*), Virus (WMV2, PRSV, ZYMV, CGMMV, MNSV).
- **Bioinformatics:** Barcoded library construction for multiplexed reads (GBS library), statistical analysis and plotting data in R interface, Genetic map construction, QTL analysis, and GWAS.
- **Microscopy research:** Cross-sections, optical microscopy, confocal microscopy, dissecting microscopy.
- **NGS Library PREP:** NEBNext Ultra II FS DNA Library Prep with Sample Purification Bead (NEB)

Oral presentation

1. **YJ Jang**, BK Han, GB Kwon, HS Yun GP Lee. 2018. Identification of a causal region providing resistance to *Colletotrichum orbiculare* race 1 in watermelon (a mechanism is evolutionary conserved). Korean Society for Horticultural Science.

Poster presentation

1. **YJ Jang**, MS Seo, BK Han, GP Lee, 2020
Construction of reference genome sequence of cultivated-type 'SBA' and citron-type PI189225 accession in Watermelon. Plant and Animal Genome XXVII
2. **YJ Jang** MS Seo, BK Han, HS Yun, HJ Joo, NJ Yeo, JH Huh, GP Lee, 2019
Transcriptome analysis for anthracnose resistance in watermelon reveals insight into the co-expression patterns of changeable expression. The Korea Society of Breeding Science.
3. NJ Yeo, **YJ Jang**, BK Han, HJ Joo, JH Huh, YJ Park, GP Lee, 2019
QTL analysis of Watermelon Mosaic Virus 2 resistance with a novel watermelon germplasm. Korean Society for Horticultural Science.
4. HJ Joo, **YJ Jang**, BK Han, NJ Yeo, JH Huh, YJ Park, GP Lee, 2019
Identification of molecular markers associated with the lobed leaf shape of watermelon. Korean Society for Horticultural Science.
5. **YJ Jang**, MS Seo, CP Hersh, SJ Rhee, YJ Kim, BK Han, GP Lee, 2019
Non-synonymous SNP in leucine-rich repeat determines anthracnose resistance in watermelon, a mechanism is evolutionary conserved. Plant and Animal Genome XXVII
6. GB Kwon, **YJ Jang**, BK Han, HS Yun, HJ Cho, NY Yeo, GP Lee, 2018. QTL analysis and development of molecular markers for the resistance to *Fusarium oxysporum* f.sp. *niveum* race 2 using newly introduced watermelon germplasm. Korean Society for Horticultural Science

7. HS Yun, BK Han, **YJ Jang**, GB Kwon, HJ Cho, NY Yeo, GP Lee. 2018. Development of molecular markers linked to dwarf trait in watermelon. Korean Society for Horticultural Science
8. **YJ Jang**, MS Seo, BK Han, SJ Rhee, GP Lee, Time-series transcriptome analysis to identify resistance mechanisms to anthracnose caused by *Colletotrichum orbiculare* race 1 in watermelon. Plant and Animal Genome XXVI
9. **YJ Jang**, CS Kim, SJ Rhee, BK Han, TY Sim, TH Kwon, GP Lee, 2016. Evaluation of southern by sequencing method to analyze molecular characteristics of transgenic rice calli, The Korean Society for Plant Biotechnology
10. **YJ Jang**, CS Kim, SJ Rhee, BK Han, TY Sim, GP Lee, 2016. Establishment of quantitative analysis of introduced gene in CMV-resistant GM-pepper, Korean Society for Horticultural Science
11. SJ Rhee, TH Kwon, MS Seo, **YJ Jang**, TY Sim, and GP Lee, 2016. De novo transcriptome analysis for identifying differentially expressed genes in male sterile and fertile watermelon, America Society of Plant Biologists.
12. SJ Rhee, **YJ Jang**, B Han, YJ Ko, TY Sim, YJ Kim, GP Lee. 2015. Transcriptome profiling of differentially expressed genes from floral buds and flowers of male sterile and fertile lines in watermelon. The Korean Society for Horticultural Science.
13. SJ Rhee, **YJ Jang**, B Han, YJ Ko, GP Lee. 2015. Efficient genetic mapping and QTL analysis in watermelon. Plant and Animal Genome XXIII.
14. SJ Rhee, TH Lee, CS Kim, B Han, **YJ Jang**, YK Ji, GP Lee. 2014. Construction of a high-dense genetic linkage map of watermelon (*Citrullus lanatus* (Thunb.) Matsum & Nakai) using genotyping by sequencing in F2 Generation. The Korean Society for Horticultural Science.
15. SJ Rhee, **YJ Jang**, YJ Ko, B Han, YK Ji, GP Lee. 2014. Construction and application of cucumber fruit mottle mosaic virus vector for efficient virus-induced gene silencing in cucurbits. The Korean Society for Horticultural Science.
16. SJ Rhee, **YJ Jang**, GP Lee. 2014. Potential application of virus-induced gene silencing in cucurbit plants using *cucumber fruit mottle mosaic virus vector*. Plant and Animal Genome XXII.
17. **YJ Jang**, B Han, SJ Rhee, CS Kim, GP Lee. 2013. Identification and stability assessment of introduced gene in RNAi-mediated GM tomato. The Korean Society for Horticultural Science, 31(2): 102-102.
18. B Han, **YJ Jang**, SJ Rhee, CS Kim, GP Lee. 2013. Development of standard method for validation of induced gene in LMO. The Korean Society for Horticultural Science, 31(2): 102-102.

Awards

1. Best Oral Presentation Award, Conference of the Korean Society for Horticultural Science, Spring 2018.
2. Best Poster Presentation Award, Conference of the Korean Society for Horticultural Science, Spring 2014.

Patents

1. Genetic marker for selection of watermelon without lateral branch, tendril and ligule trait and use thereof. 10-2021-0117276., Patent Pending : 2021.09.02
2. Novel genetic markers for selection of watermelon with lobed leaf trait and use thereof. 10-2019-0157754., Patent Pending: 2019.11.29
3. Molecular Markers for Selection of Watermelon Dwarf Entities and Their Use. 10-2018-0120646., Patent Pending: 2018.10.10 Patent Registration: 2020.09.04
4. Molecular marker to select anthracnose resistance of plants and use thereof. 10-2018-0102939., Patent Pending: 2018.08.30
5. Molecular marker to select male-sterile watermelon and use thereof. 10-2017-0064345., Patent Pending: 2017.05.24 Patent Registration: 2020.04.07
6. Molecular marker to select anthracnose resistance of watermelon and use thereof 10-2017-0048343., Patent Pending 2017.04.14., Patent Registration: 2018.01.04
7. Molecular marker for validating seed size of watermelon and use thereof. 10-2015-0145853., Patent Pending: 2015.10.20., Patent Registration: 2019.08.09
8. Molecular marker for selecting watermelon line or cultivar resistant to powdery mildew and use thereof. 10-2015-0145359., Patent Pending: 2015.10.19., Patent Registration: 2017.04.27
9. Molecular marker for validating seed size of watermelon and use thereof. 10-2015-0145360., Patent Pending: 2015.10.19., Patent Registration: 2017.08.09

Membership of academic societies

Korean Society for Horticultural Science
The Korean Society of Breeding Science
The Korean Society for Plant Biotechnology

References

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