

Maryam Seifi Kalhor

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تحصیلات

Wageningen University and Research Center (WUR)

Wageningen,
The Netherlands

PhD in Plant Biotechnology, October 2016.

- Dissertation grade: Very good

Thesis Title: “Genetic constraints that determine rhizobium-root nodule formation in *Parasponia andersonii* “.

- **Thesis chapters:**

- ✚ Efficiency of *Agrobacterium rhizogenes*–Mediated Root Transformation of *Parasponia* and *Trema* Is Temperature Dependent
- ✚ *Agrobacterium tumefaciens*-mediated Stable Transformation of *Trema tomentosa*.
- ✚ Exogenous Nitrate Interferes with the Switch from Infection to Fixation Thread Formation in *Parasponia andersonii* Root Nodules
- ✚ Symbiotic Functioning of the GRAS-TYPE Transcriptional Regulators NSP1 and NSP2 is conserved in the Non-legume *Parasponia andersonii*.
- ✚ Dual Effect of Ethylene on Root Nodulation of *Parasponia andersonii*.

Tabriz University

Tabriz
Iran

Master of Plant Biotechnology. February 2006.

- Overall G.P.A:18.09/20
- Thesis grade: 19.75/20 (Excellent)

Thesis title: “Isolation of *Bacillus thuringiensis* variants from randomly local samples and their identification by means of contrast phase microscope and PCR “

Ilam University

Ilam,
Iran

Bachelor of Agronomy and Plant Breeding. February 2003.

- Overall G.P.A: 16.45/20
- **Final project:** “comparison of classic breeding method with biotechnological approach”

تحقیقات عملی در دوره دکترا

- Experimental research to determine the core of symbiotic genes required for nodule symbiosis in *Parasponia* based on cytokinin signaling pathway and transcription factors.
- Experimental research to determine the role of ethylene in symbiotic promiscuity in *Parasponia* and *Trema* plants.
- Experimental research to reconstruct a biological auto active symbiotic signaling cascade in the non- symbiotic *Trema* plants.
- Experimental research to determine transcription factor interactions in Nod factor signaling cascade.
- Experimental research to design mega vectors using gateway technology to induce nodule formation in non-legumes.
- Experimental research to CRISPR/Cas9-mediated mutagenesis in *Parasponia andersonii* plants.

دوره های تحقیقاتی

- **Dept. of plant science, Tehran University, Post-doctoral researcher, Tehran, Iran. (2018).**

Project: Investigation of the Gama Amino Butyric Acid (GABA) effect on drought tolerance induction in susceptible (MCC558, MCC759) and resistant (Azad, Mansoor) chickpea varieties under water deficit conditions.

- Identifying key genes regulating drought stress in pea plant.

- **Dept. of plant science, Shahid Beheshty University, Post-doctoral researcher, Tehran. Iran (2016-2017).**

Project: Effect of different plant growth regulators on plant resistant to abiotic stresses.

- Investigation of GABA effect on plants (maiz, lettuce) tolerance to salinity and cadmium stresses.
- Identifying of key genes regulating polyamine biosynthesis during cadmium stress under GABA treatment.
- Investigation of plant growth promoting bacteria on salinity tolerance in lettuce plants.
- Investigation of biological seed coat techniques and cyanobacteria *Arthrospira platensis* L. on corn plant resistance to cadmium stress.

- **Dept. of plant science, Biotechnology laboratory, Tabriz University, Iran**

- Transformation of Cry genes to rice plant and phenotyping of transgenic plants.
- Characterization of soil plant growth promoting bacteria.

مقالات چاپ شده در مجلات خارجی

- Seyedeh Batool Hassani, Mojgan Latifi, Sasan Aliniaiefard, Shabnam Sohrabi Bonab, Neda Nasiri Almaghadim, Sara Jafari, Elham Mohebbifar, Anahita Ahangir, **Maryam**

Seifikalhor, Hassan Rezadoost, Massimo Bosacchi, Anshu Rastogi, Françoise Bernard (2023). Response to Cadmium Toxicity: Orchestration of Polyamines and microRNAs in Maize Plant. **Plants**.

- **Maryam Seifikalhor**, Vahid Niknam, Sasan Aliniaefard, Fardad Didaran, Georgios Tsaniklidis, Dimitrios Fanourakis, Mahsa Teymoorzadeh, Seyed Hasan Mousavi, Massimo Bosacchi, Tao Li (2022). The regulatory role of γ -Aminobutyric acid in chickpea plants depends on drought tolerance and water scarcity level. **Scientific Reports**
- **Seifikalhor, M**, Aliniaefard, S, Bernard, F, Seif, M, Latifi M, Hassani, B, Didaran, F, Bosacchi, M, Rezadoost, H, Li, T. (2020). γ -Aminobutyric acid confers cadmium tolerance in maize plants by concerted regulation of polyamine metabolism and antioxidant defense systems. **Scientific Reports**.
- Robin van Velzen, Rens Holmer, Fengjiao Bu, Luuk Rutten, Arjan van Zeijl, Wei Liu, Luca Santuari, Qingqin Cao, Trupti Sharma, Defeng Shen, Yuda Roswanjaya, Titis A. K. Wardhani, **Maryam Seifi Kalhor**, Joelle Jansen, Johan van den Hoogen, Berivan Güngör, Marijke Hartog, Jan Hontelez, Jan Verver, Wei-Cai Yang, Elio Schijlen, Rimi Repin, Menno Schilthuisen, M. Eric Schranz, Renze Heidstra, Kana Miyata, Elena Fedorova, Wouter Kohlen, Ton Bisseling, Sandra Smit, and Rene Geurts. (2018). Comparative genomics of the nonlegume *Parasponia* reveals insights into evolution of nitrogen-fixing rhizobium symbioses. **PNAS**. 201721395.
- **Seifikalhor, M, Hassani, B, Aliniaefard, A.** (2019). Seed priming by cyanobacteria (*Spirulina platensis*) and salep gum enhances tolerance of maize plant against cadmium toxicity. **Journal of plant growth regulation**.
- **SeifiKalhor, M**, Aliniaefard, S. Niknam, V. Hassani, B. Lastochkina, O. (2019). Diverse role of γ -aminobutyric acid in dynamic plant cell responses. **Plant Cell Reports**. 1-21.
- **Seifikalhor, M**, Aliniaefard, S, Shimali, I, Azad, N, Hassani, B, Lastochkina, O, Li, T. (2019). Calcium signaling and salt tolerance are diversely entwined in plants. **Plant signaling and behavior**.
- **SeifiKalhor, M**, Sasan, A., Seif, M., Asayesh, E.J., Bernard, F., Hassani, B. (2018). Enhanced salt tolerance and photosynthetic performance: Implication of γ -amino butyric acid application in salt-exposed lettuce (*Lactuca sativa* L.) plants. **Plant Physiology and Biochemistry**.
- Oksana Lastochkina ,Sasan Aliniaefard ,**Maryam SeifiKalhor** ,Massimo Bosacchi ,Dilara Maslennikova and Alsu Lubyanova. (2022) Novel Approaches for Sustainable Horticultural Crop Production: Advances and Prospects. **Horticulturae**
- Oksana Lastochkina, **Maryam Seifikalhor**, Sasan Aliniaefard, Andrey Baymiev, Ludmila Pusenkova, Svetlana Garipova, Darya Kulabuhova and Igor Maksimov. (2019). *Bacillus* Spp.: Efficient Biotic Strategy to Control Postharvest Diseases of Fruits and Vegetables. **Plants**.
- Arjan van Zeijl, Titis Wardhani, **Maryam Seifi Kalhor**, Luuk Rutten, Fengjiao Bu, Marijke Hartog, Sidney Linders, Elena Fedorova, Ton Bisseling, Wouter Kohlen, and Rene Geurts (2017). CRISPR/Cas9-Mediated Mutagenesis of Four Putative Symbiosis Genes of the Tropical Tree *Parasponia andersonii* Reveals Novel Phenotypes. **Frontiers in plant science**.

- Robin van Velzen, Rens Holmer, Fengjiao Bu, Luuk Rutten, Arjan van Zeijl, Wei Liu, Luca Santuari, Qingqin Cao, Trupti Sharma, Defeng Shen, Yuda P. Roswanjaya, Titis A.K. Wardhani, **Maryam Seifi Kalhor**, Joëlle Jansen, D. Johan van den Hoogen, Berivan Güngör1, Marijke Hartog, Jan Hontelez, Jan Verver, Wei-Cai Yang, Elio Schijlen, Rimi Repin, Menno Schilthuizen, M. Eric Schranz, Renze Heidstra, Kana Miyata, Elena Fedorova, Wouter Kohlen, Ton Bisseling, Sandra Smit & Rene Geurts. (2017). Parallel loss of symbiosis genes in relatives of nitrogen-fixing non-1 legume *Parasponia*. **BioRxiv**. 169706.
- Oksana Lastochkina *, Sasan Aliniaiefard, **Maryam SeifiKalhor**, Massimo Bosacchi, Dilara Maslennikova, Alsu Lubyanova. Novel approaches for sustainable horticultural crop production: advances and prospects. **Horticulturae**. 1904742
- **SeifiKalhor, M.**, Aliniaiefard, S., Seif, M., Javadi, E., Li. T., Lastochkina, O. (2017). Rhizobacteria *Bacillus subtilis* reduces toxic effects of high electrical conductivity in soilless culture of lettuce. **Acta horticulture**. 1227.59.
- Aliniaiefard S, Hajilou J, Tabatabaei SJ, **SifiKalhor M** . (2016). Effects of Ascorbic Acid and Reduced Glutathione on the Alleviation of Salinity Stress in Olive Plants. **International Journal of Fruit Science** 16:395-409.
- Qinqin, C., Op den camp, R., **SeifiKalhor, M.**, Geurts, R., Bisseling, T. (2012) Efficiency of *Agrobacterium rhizogenes*-mediated root transformation of *Parasponia* and *Trema* is temperature dependent. **Plant Growth Regulation**. 68, 459-465.

کنفرانس های بین المللی

- Lastochkina, O, **Seifikalhor, M**, Aliniaiefard, S, Seif, M, Niknam, V, Sobhani, M. (2019). Adjusting photosynthetic electron transport machinery of salt exposed lettuce plants through rhizobacteria *Bacillus subtilis*. 10th International Conference “Photosynthesis and Hydrogen Energy Research for Sustainability. Saint Petersburg, Russia.
- **Seifi Kalhor, M.**, Javadi, E., Aliniaiefard, S., Seif, M., Bernard, F. Improvement of salinity tolerance in lettuce (*Lactuca sativa* L.) seedling by Gamma Amino Butyric Acid (GABA). 30th international horticultural congress (oral) (2018). Istanbul, Turkey.
- **Seifi Kalhor, M.**, Aliniaiefard, S., Seif, M., Javadi, E., Li. T., Lastochkina, O. Rhizobacteria *Bacillus subtilis* reduces toxic effects of high electrical conductivity in soilless culture of lettuce. International ISHS Symposium on Greensys. (oral) (2017). Beijing, China.
- **Seifi Kalhor, M.**, Aliniaiefard, S., Seif, M., Li. T. Enhancement of growth and photosynthetic performance of soilless-cultured corn exposed to cadmium toxicity using gamma aminobutyric acid (GABA). International ISHS Symposium on Greensys. (2017). Beijing, China.
- **Seifikalhor, M.**, Hartog, M., Bisseling, T., Geurts, R., High efficiency of apical meristem transformation in *Trema tomentosa* plants. International conference of plant transformation, Vienna, Austria. (2014).

- **Seifikalhor, M., Bisseling, T., Geurts, R., Ethylene inhibit root nodule formation in non-legume *Parasponia andersonii*. International EPSO conference, Greece. (2013).**
- **Seifi kalhor, M., Bisseling, T., Geurts, R., Nitrate regulates rhizobium-Parasponia symbiosis. 3rd International conference on microbial communication, Jena, Germany. (2012).**

مقالات چاپ شده در مجلات داخلی

- طباطبایی، س. ج. حاجیلو، ج. سیفی کلهر، م. 1388. واکنش رشدی و فیزیولوژیکی زیتون به مواد آنتی اکسیدانت و شوری. مجله علمی پژوهشی علوم و فنون باغبانی ایران. 9(4): 275-284.
- علی نیایی فرد، س. سیفی کلهر، م. 1395. اثر نور آبی بر فتوسنتز گیاه برگ بیدی (*Tradescantia virginiana*) پرورش یافته در شرایط اختلاف فشار بخار آب متفاوت. مجله علمی پژوهشی پژوهشهای گیاهی.
- علی نیایی فرد، س. شهلائی، الف. سیفی کلهر، م. 1389. راهبردهایی جهت افزایش ریشه زایی در زیتون. مجله علمی تخصصی زیتون. 202: 34-37.

کنفرانس های داخلی

- سیفی کلهر، م. باغبان کهنه روز، ب. 1387. جداسازی ایزوله های *Bacillus thuringiensis* از خاک و بررسی ویژگیهای اختصاصی آن. همایش ملی فناوری های نوین در کشاورزی و منابع طبیعی. رشت.
- سیفی کلهر، م. نیکنام، و. سیف، م. علی نیایی فرد، س. حسنی، ب. کاهش اثرات منفی شوری بر رشد و فتوسنتز کاهو با استفاده از گاما آمینو بوتیریک اسید. پنجمین کنگره ملی هیدروپونیک و تولیدات گلخانه ای. شیراز.
- علی نیایی فرد، س. ملکی آسایش، ز. سیفی کلهر، م. 1394. اثرات کوتاه مدت گازهای آلاینده شهری (اکسید نیتریک و دی اکسید کربن) بر فتوسنتز گیاه برگ بیدی. همایش ملی توسعه پایدار فضای سبز. تبریز.

کارگاه های تخصصی گذرانده شده

- **Tool Box practical course for training molecular biology principles and methods.** RNA and DNA Isolation, Tissue culture system, Quantitative RT-PCR (qPCR), State of the art cloning – Gateway technology, Reporter gene fusion, getting skills via using Confocal Microscopy, Sterio and Lica microscopy, Plant transformation (“hairy” roots), Gene-promoter analysis, Co-Immunoprecipitation, Western blot, Split-Ubiquitin Yeast-2-Hybrid system, Split-YFP system in plants and data base searches. (**Wageningenn University**).
- **Training Bioinformatics course**
 - High-throughput tandem mass spectrometry, DNA sequence analysis, Construction of arrays and micro arrays, Annotation of DNA and protein sequences and Ontologies, Protein modeling and structures, Widely used bioinformatics applications for DNA assembly, Identification of protein motifs and protein structure prediction, Advantages and shortcomings of databases that store text, nucleotide and protein sequences and DNA microarray data, An understanding of the appropriate application of a range of bioinformatics software, Getting ability to select the most appropriate bioinformatics tools for a given analysis and to synthesize genomics information with respect to the biological questions. (**Wageningenn University**).

- **Advanced Bioinformatics**
 - Sequence comparison , Pairwise textual sequence alignment, Global sequence alignment, Local sequence alignment, ORF identification and translation, Restriction maps, Primer design, Sequence alignment score, Gene identification software, Protein sequence analysis, Primary and secondary structure, Hydropathy, JPRED, Sequence motifs and domains, PSI-BLAST.
- **Techniques for Writing and Presenting a Scientific Paper. (Wageningen University).**
- **Writing Scientific Paper. (Wageningen University).**
- **Generalized Linear Model. (Wageningen University).**
- **Interpersonal communication of PhD students. (Wageningen University).**

توانمندی ها

- **Specific skills**
 - RNA and DNA isolation, Tissue culture system, Quantitative RT-PCR (qPCR), State of the art cloning – Gateway technology, Reporter gene fusion, working with Confocal Microscopy, Sterio and Lica microscopy, Plant transformation (“hairy” roots, stable line, deep flowering and agroinfiltration), Gene-promoter analysis, Co-Immunoprecipitation, Split-Ubiquitin Yeast-2-Hybrid system, Split-YFP system in plants, Enzymatic assay, Polamine isolation, HPLC assay, Chromatography (Microtom).
 - Data base searches and bioinformatics data analysis.
- **General skills**
 - Excellent English skills (oral, written and presentation)
 - Understanding of the fundamentals of plant physiology and biology and the key principles of biochemistry and molecular biology.
 - Ability to use computers as information and research tools.
 - Ability to collaborate with **international researchers**
 - Ability to use oral, written and visual presentations to present of work to both a science literate and a science non-literate audience.

طرح های پذیرفته شده

- **سیفی کلهر، م، حسنی ب، فرناد ن، 1402.** پوشش بذر نانوگابا: ضد تنش خشکی و با ماندگاری بالا در خاک. استاد توسعه نانو.
- **علی نیایی فرد، س .سیفی کلهر، م .رضائی نژاد، ع .سلاحورزیان، الف . 1388 .** بهبود مقاومت به سمیت بور در گیاه دارویی نعناع فلفلی (*Mentha piperita*) با استفاده از اسید سالیسیلیک . طرح پژوهشی جهاد دانشگاهی استان لرستان. **همکار اصلی طرح.**
- **حسنى، ب. سیفی کلهر، م. علی نیایی فرد، س. صادقی، ح. 1397.** تاثیر پوشش دهی بذر با ثعلب همراه با باکتری های احیا کننده سولفات به عنوان کودهای زیستی بر پاسخ های رشدی و فیزیولوژیکی گیاه کاهو (*Lactuca sativa L*) تحت

تنش‌های خشکی و کادمیوم. 1397. طرح پژوهشی پذیرفته شده در صندوق حمایت از پژوهشگران جوان. مجری اصلی

طرح:

- نیکنام، و. سیفی کلهر، م. بررسی سازوکار اثر گاما آمینوبوتیریک اسید (گابا) بر القای تحمل به خشکی در ارقام نخود (*Cicer arietinum* L.) حساس (MCC759، MCC588) و مقاوم (آزاد و منصور) در شرایط تنش کم آبی. 1397. طرح پژوهشی پذیرفته شده در صندوق حمایت از پژوهشگران جوان. مجری اصلی طرح.
- علی نیایی فرد، س. سیفی کلهر، م. سیف، م. بهبود رشد، فتوسنتز و کیفیت محصولات باغی با استفاده از طیف‌های مختلف نور. 1397. طرح پژوهشی پذیرفته شده در صندوق حمایت از پژوهشگران جوان. همکار اصلی طرح.

سوابق تدریس

- **Lecturer**
 - **Principles of plant tissue culture.** Wageningen University Molecular biology group. Teacher assistant. **2012.**
 - **Basics of bioinformatics.** Wageningen University. **2013.**
- **Practical advisor**
 - Description of photosynthesis measurement methods, Shahid Beheshty University, 2018.
- **Plant Biotechnology.** Tehran University. 2019.
- **Plant physiology.** Tehran University. 2020.

جوایز و افتخارات

- Dr Shahriari award from National Elite Foundation. Tehran, Iran, 2019.
- Postdoctoral fellowship of Shahid Beheshty University supported by National Elite Foundation. Tehran, Iran. 2016.
- Postdoctoral fellowship of Tehran University supported by Iran National Science Foundation (INSF). Tehran, Iran. 2018.
- PhD fellowship of Wageningen University and Research Center, The Netherlands. 2010.
- LEB founding for conference attendance, Wageningen University. 2014.
- Top student in bachelor degree chosen by Brilliant Talent Center of Ilam University 2005.
- Members of the Program Committee of the III NATIONAL CONFERENCE WITH INTERNATIONAL INVOLVING Modern Problems in Biochemistry, Genetics, and Biotechnology. Russia. 2020.

راهنمایی و مشاوره پایان نامه

- The effects of cytokinin on nodulation of non-legume *Parasponia andersonii*, BSc thesis, Wageningen University, Main advisor. (2012).

- Effect of plant hormones in expression of HLK gene in *Parasponia andersonii*. MSc thesis. Main advisor (2012).
- Markers underlying endosymbiosis in *Parasponia andersonii* and *Trema tomentosa*. PhD thesis. Co-advisor. (2013).
- تأثیر پوشش بذر حاوی ثعلب برای افزایش مقاومت به تنش کادمیوم در گیاه ذرت. استاد مشاور. دانشگاه شهید بهشتی (1397).
خاتمه یافته.
- پاسخ های فیزیولوژیکی و مولکولی گل شاخه بریده ژبررا تحت تاثیر نانو کامپوزیت های آلی (کیتوزان – گابا).استاد مشاور. دانشگاه شهید بهشتی (1399). خاتمه یافته.
- بررسی اثر گابا (گاما آمینو بوتیریک اسید) بر بهبود تحمل تنش خشکی در زعفران مزروعی (*Crocus sativus* L). استاد مشاور. دانشگاه تهران (1397). خاتمه یافته.
- بررسی اثر گابا، بر روی القا مقاومت به خشکی در گیاه ذرت. استاد مشاور. دانشگاه تهران (1399). خاتمه یافته.

کتاب چاپ شده

- شهلائی، الف. علی نیایی فرد، س. سیفی کلهر، م. 1392. علفهای هرز باغ های میوه (شناسائی و مبارزه). انتشارات دانشگاه آزاد اسلامی.

- Wheat Production in Changing Environments - Management, Adaptation and Tolerance. O. Lastochkina, M. Seifi Kalhor, S. Aliniaiefard, R. Yuldashev, L. Pusenkova and S. Garipova. 2018. DOI: 10.1007/978-981-13-6883-7_23. In book: **Wheat Production in Changing Environments**.
- Calcium Signaling in Plants Under Drought. Sasan Aliniaiefard, Aida shomali, Maryam Seifikalhor, Oksana Lastochkina. 2020. **Salt and Drought Stress Tolerance in Plants**.