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Summary

My research on spices started with research on 'Biomass production and partitioning of photosynthates in ginger (*Zingiber officinale* R.) under different shade levels ' in which the photosynthetic efficiency was measured using CO₂ analyser and partitioning of photosynthates under different shade levels was studied by radiotracer techniques using ¹⁴C . The effect of organic manures and microbial inoculants on the growth, yield, and quality of ginger was undertaken as Ph.D. research and the result became part of the Package of Practices Recommendations of Kerala Agricultural University. The research on Spices continued when I joined KAU at Cardamom Research Station in the All India Coordinated Research Project on spices. I have also been involved in the research leading to the release of small cardamom variety PV3 and PV5 from CRS, Pampadumpara. Modernization of Farm at CRS, Pampadumpara, and production of planting material by rapid multiplication method was started with me as the Principal Investigator. The academic activities on spices started at the Department of Plantation Crops and Spices, College of Agriculture, Vellayani by teaching undergraduate, post-graduate, and doctorate degree. Organized one agricultural exhibition for farmers at Gandhi Mission, Cherukode, Mulayara showcasing the organic and sustainable agricultural techniques developed by KAU in connection with Gandhi Jayanthi. I was the Co-ordinator of National Webinar on Spice Improvement, Processing and Marketing and Poster competition organized by RARS(SZ) Vellayani. A mother plant block on spices comprising of different varieties was established at Instructional Farm, College of Agriculture, Vellayani. A Hi-tech polyhouse with a hydroponics facility has been established at the College of Agriculture, Vellayani for planting material production of spices. I have evaluated and identified two high-yielding clove varieties from clove estates of Southern Western Ghats. My present research is on standardizing developing drip fertigation for spices and smart farming techniques in spice management.

Research Highlights

- Isolated, characterized and identified microbial isolate for retting of black pepper and deposited at NCBI.
- Standardised fermentation and centrifugation method for the production of virgin coconut oil.
- Involved in the research of small cardamom leading to the release of small cardamom variety , PV3 and PV5.
- Developed polyploids in ginger using colchicine.
- Surveyed, and evaluated clove genotypes of Southern Western Ghats and identified two high-yielding clove genotypes for release of a variety
- Standardised hybridization technique in clove.

Experience

Joined Kerala Agricultural University as Assistant Professor (Horticulture) in the year 2009.

Education

- Graduated in BSc (Agriculture) from Kerala Agricultural University (1996)
 - Post Graduation in MSc(Horticulture) from Kerala Agricultural University (1999)
 - Ph.D in MSc(Horticulture) from Kerala Agricultural University (2004)
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Area of Specialization

Breeding of Spices, Crop Management of Spices

Awards & Recognitions

- ICAR Junior fellowship for doing M. Sc in Horticulture
 - Won the best presentation of research paper on the National Seminar on “Emerging Trends in Sensor Technology for the Environmental Studies” on 21-22 June, 2005 sponsored by UGC.
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Research Projects

Ongoing

1. Establishment of Hi tech Spice Nursery – SHM, Kerala - Rs 18 lakhs
2. Development of freeze dried coconut and to access the quality of the product- Annual State Plan 2020-21, Government of Kerala

Completed

1. All India Coordinated Research Project on Spices - projects at Cardamom Research Station, Pampadumpara, Kerala Agricultural University from 5/8/2009 to 5/3/2011.
2. All India Coordinated Vegetable Improvement Programme projects from 6/3/2011 to 31/1/2012 at the Department of Vegetable Science, College of Horticulture, Vellanikkara, Kerala Agricultural University
3. Product standardization of jack shankaravaratty - KAU Non-Plan Initial Evaluation Trial of ginger genotypes for yield and quality - KAU Non-Plan
4. Comparative Field trials of ginger genotypes for yield and quality - KAU Non-Plan
5. Protocol development for white pepper production – KSCSTE
6. Germplasm collection, evaluation, and evolving management practices for regular bearing in clove *Syzygium aromaticum* (L) Merr & Perry) accessions. Annual State Plan 2018-19, Government of Kerala
7. Establishment of mother plant blocks of spice plants- Annual State Plan 2020-21, Government of Kerala
Development and evaluation of polyploids and superior genotypes in ginger (*Zingiber officinale* Rosc) for yield and resistance to rhizome rot. Annual State Plan 2020-21, Government of Kerala

Publications

Journal Articles

1. Photosynthesates rate and related parameters of ginger under different shade levels, *Journal of Plantation Crops*.29930: 50-52, 2002.
2. Influence of shade regimes on the physiological parameters of ginger, *Journal of Spices and Aromatic Crops*. 11(1): 30-34, 2002.
3. Effect of organic manures and microbial inoculants on nutrient uptake, yield and nutrient status of soil in ginger intercropped coconut garden *Journal of Plantation Crops and Spices*. 2006.34(1): 25-31
4. Marketing Scenario of fruits and Vegetables in Kerala. **Journal of Agricultural Extension Management**.Vol.X11.Jan- June 2011. No.1 pp.69-76.
5. Effect of organic manures and biofertilizers on nutrient status of soil in ginger intercropped in coconut garden. National Biodiversity Congress 2012. Dec.27-Dec 30, 2012, Organised by Kerala State Biodiversity Board.
6. Sreekala,G.S. and Sulekha,G.R.2013. Value-added products from coconut. Launching of Keramrutham.6-11-2013.Souvenir.College of Agriculture, Vellayani, Kerala Agricultural University.28-32.
7. Sreekala,G.S. 2015. Effect of organic manures and biofertilizers on nutrient status of soil in ginger intercropped in coconut garden. *International Journal of Current Research*. 7(3): 13694-13698.
8. Sreekala,G.S. and Sonia, V. 2015. Effect of pretreatments and curing methods on the flavor profile of essential oil of processed small cardamom (*Elettaria cardamomum*(L.) Maton. *International Journal of Applied and Pure Science and Agriculture* 1(2): 97-110.
9. Jayasheela, D.S. Sreekala, G.S., Meenakumari, K.S. and Subba,A, 2015.Effect of different sanitizing agents on reducing the post-harvest loss in papaya (*Carica papaya* L.) variety Coorg Honeydew for the local market. *Int. J. Trop. Agri*. 33 (2); 405-407.
10. Jayasheela, D.S. Sreekala, G.S., Mini, C. and Subba,A, 2015.Post-harvest management of papaya variety Coorg Honeydew for the distant market. *Int. J. Trop. Agri*. 33(2); 409-414
11. Jayasheela, D.S., Sreekala, G.S. and Prasanth, K.2015. Value addition of Banana: key roles to minimize post-harvest losses. *International Journal of Advanced Research* 3(5): 833-835.
12. Jayasheela, D.S. Sreekala, G.S., Mini,C., Jayachandran Nair , C.S. and Meenakumari, K.S.2016.Post-harvest management of papaya. *Res. Environ. Life Sci*. 9(1): 120-123.
13. Thanuja,T.T. Sreekala,G.S.2015.Effect of drying temperature on quality of virgin coconut oil produced by fermentation method.*Trends in Biosciences* 8(19) : 5279-5285.
14. Thanuja,T.T. Sreekala,G.S.2016.Production technologies of virgin coconut oil: a review. *Advances in Life Sciences* 5(10) :3932- 3936.
15. Thanuja,T.T. Sreekala,G.S. and Meenakumari, K.S.2016. Isolation of microorganisms from the fermented coconut milk and comparison of quality parameters of virgin coconut oil recovered by induced fermentation. *International Journal of Advanced Research* 4 (6): 1927-1934.
16. Sonia,N.S., Jessykutty, P.C. and Sreekala,G.S.2017. Effect of pretreatments and drying methods on nutrient composition and sensory quality of milk yam(*Ipomoea digitata* L.) tuber powder. *International Journal of Processing and Post Harvest Technology*. 8(2): 75-82.
17. Sonia, N.S., Jessykutty, P.C. and Sreekala,G.S.2017. Effect of pretreatments and drying methods on milk yam (*Ipomoea digitata* L.) tuber powder preparation tuber powder. *International Journal of Medicine and Pharmaceutical Science* 7(4): 7-14.
18. Sandra, M.M. and Sreekala, G.S. 2018. Effect of mulch and nutrients on growth and yield in transplanted ginger. *Agricultural Research Communication Centre* 53(6) : 693-697
19. Sandra, M.M. and Sreekala, G.S. 2018. Effect of plastic mulch on suppression of weeds in transplanted ginger. *Journal of Pharmacognosy and Phtochemistry* 7(6) : 1244-

20. Aparna, K. and Sreekala G.S.2018.Chlorophyll status in leaves of coconut palms (*Cocos nucifera* L.) showing general yellowing. International Journal of Pure and Applied Bioscience 696 : 1254-1257 .
21. G.S. Sreekala, K.S. Meenakumari and S. Vigi.2019. Microbial isolate for the production of quality white pepper (*Piper nigrum* L.)". - Journal of Tropical Agriculture , 57 (2): 114-121.
22. Genetic variability, correlation and path analysis in ginger (*Zingiber officinale* Rosc.) genotypes Anargha,T., Sreekala, G.S., Nair, D.S. and Abraham, M. Journal of Tropical Agriculture , 58 (2): 168-178, 2020
23. Growth and Yield responses of Ginger (*Zingiber officinale* Rosc.) varieties to elevated CO₂ R. Manasa R. V. Manju, Roy Stephen, M. M. Viji , R. Beena and G. S. Sreekala. Chem. Sci .Rev. Lett. 2020, 9 (33): 34-39
24. Effect of physical seed pre-treatments on morphology and yield of *Ocimum basilicum* L. Akhilraj B.C., Deepa S Nair, Sreekala G.S., Anith K.N and Sajitharani, T., Journal of Pharmacognosy and Phytochemistry 2020, 9(5): 1254-1257

Seminar proceedings

1. Rhizome characters of ginger as influenced by different shade levels. *Proceedings of thirteenth Kerala Science Congress*, January 2001, Thrissur, pp.386-387.
2. Effect of shade on chlorophyll pigment of ginger cv. Rio-de-Janeiro. *Proceedings of thirteenth Kerala Science Congress*, January 2001, Thrissur, pp.460-461.
3. Influence of shade regimes on starch fibre content of ginger:' *Proceedings of fourteenth Kerala Science Congress, 29-31*, January 2002, Kochi, pp.338-340.
4. Organic ginger cultivation enhances yield and soil nutrients. UGC sponsored National Seminar on "*Emerging Trends in Sensor Technology for Environmental studies*". June 21, 22 2005, Palakkad, pp.51.
5. Tracing photosynthates using ¹⁴C and its effect on yield in ginger under different shade regimes. *20th Kerala Science Congress, Thiruvananthpuram*
6. Oushadasasya krishiyum sadhyathakalum. *Souvenir- National seminar on "Promotion of cultivation and marketing of medicinal plants."* 2009 Published by State Horticultural Mission.
7. Market Interventions for vegetable growers in Kerala. Swadesh Prem Jagriti Sangoshi 2011. **National Conference on Hori Business Linking Farmers with market.** May 28-31, 2011. Dehradun, organized by Lt. Amith Singh Memorial Foundaion , New Delhi in collaboration with S.V.B.P. Univ. of Agriculture and Technoloy, Meeut and G.B.Pant Univ. of Agriculture and Technlogy, Pantnagar.pp.73
8. Organic ginger- a cost effective agrotechnique. *Cetanery National Seminar on" Convergence of technologies for organic horticulture"*. South Indian Horticulture Association, Coimbatore.
9. Organic ginger-a holistic approach. *Natural Resource Management and livelihood support system. Compendium of selected Research paper and articles of State Level Seminar 2007.*
10. Sreekala, G. S., Avinash, M., Nainu, Joseph, and Reshma, P. Morphological characterisaion of clove (*Syzygium aromaticum* (L.) Merr. & Perry) genotypes in major clove growing areas of southern western ghats. 9 th Indian Horticultural Congress ,18/11/2021 to 21/11/2021.
11. Sandra, M.M., Sreekala, G.S. and Aparna, K. 2018. Effect of mulch and fertilisers on growth parameters in transplanted ginger . In : Das,S. (ed.), Proceedings of the thirtyth Kerala Science Congress, 28-30

January, 2018, Thalassery, Kerala State Committee on Science, Technology and Environment, Government of Kerala, pp. 18-19.

12. Anargha T., Sreekala G. S. and Deepa S. Nair 2021, Rhizome characters of ginger (*Zingiber officinale* Rosc.) genotypes of Kerala. In : Roy Stephen and Sreekala G.S.(eds.), Proceedings of the National Webinar on Spice Improvement, Processing and Marketing, 7-8 October, 2020 Regional Agricultural Research Station (Southern Zone), Vellayani, Kerala Agricultural University,pp.111.
13. Pooja S., Sreekala G. S. and Prathapan K. D.2021. Insect visit of inflorescence of black pepper (In : Roy Stephen and Sreekala G.S.(eds.), Proceedings of the National Webinar on Spice Improvement, Processing and Marketing, 7-8 October, 2020 Regional Agricultural Research Station (Southern Zone) Vellayani, Kerala Agricultural University,pp.113
14. Reddappa, J. B., Sreekala, G. S. and Roy Stephen. 2020. Pollen characteristics of clove (*Syzygium aromaticum* (L.) Merr. & Perry) In : Roy Stephen and Sreekala G.S.(eds.), Proceedings of the National Webinar on Spice Improvement, Processing and Marketing, 7-8 October, 2020 Regional Agricultural Research Station , Southern Zone, Vellayani, Kerala Agricultural University,pp.114.
15. Sandra Merin Mathew and Sreekala G. S . 2020.Effect of mulch and nutrients on rhizome characters in transplanted ginger In : Roy Stephen and Sreekala G.S.(eds.), Proceedings of the National Webinar on Spice Improvement, Processing and Marketing, 7-8 October, 2020 Regional Agricultural Research Station , Southern Zone, Vellayani, Kerala Agricultural University,pp. 123
16. Bommana Divya, Heera, G. , Radhika, N.S., Sreekala G.S. and Joy Michal Johnson . 2020. In vitro evaluation of new generation and combination fungicides for the management of anthracnose of nutmeg (*Myristica fragrans* Houtt.) In : Roy Stephen and Sreekala G.S.(eds.), Proceedings of the National Webinar on Spice Improvement, Processing and Marketing, 7-8 October, 2020 Regional Agricultural Research Station , Southern Zone, Vellayani, Kerala Agricultural University,pp 130
17. Athira, K., Heera, G. , Radhika, N.S., Sreekala G.S. and Joy Michal Johnson. 2020. In vitro evaluation of fungicides against *Colletotrichum gloeosporioides* causing anthracnose of black pepper (*Piper nigrum* L.) In : Roy Stephen and Sreekala G.S.(eds.), Proceedings of the National Webinar on Spice Improvement, Processing and Marketing, 7-8 October, 2020 Regional Agricultural Research Station , Southern Zone, Vellayani, Kerala Agricultural University, pp 131

International seminar/symposium

1. Floristic diversity in cardamom plantation .2nd International Seminar and workshop on “ Sustainable utilization of Tropical Plant Biomass “ 14-15 Dec.2010. University of Kerala, Trivandrum
2. Sonia,V. and Sreekala,G.S. 2015. Effect of pretreatments and curing methods on the flavor profile of essential oil of processed small cardamom (*Elettaria cardamomum* (L.)Maton. International Symposium on Phytochemistry and Prof. Dr.A.Hisham Endowment Award Ceremony 25 , April, 2015 Organised by Kerala Academy of Sciences, Thiruvananthapuram.p.25
3. Sreekala,G.S. and Meenakumari, K.S.2018. International Seminar on Emerging Trends in Organic Farming and Sustainable Agriculture held at CMS College, Kottayam from 22 to 24 April, 2018.

4. Anargha T., Sreekala G.S. and Deepa S. Nair .Abstracts/extended abstracts on Variability in ginger accessions for morphological and yield traits. Proceedings Provectus Plantae 2019. International Conference on Exploring the Scope of Plant Genetic Resources 22-24th May 2019. Dept. of Botany, University of Kerala, Kerala, India Abstract PGR 3 pp 348-350
5. Sonia N.S., Jessykutty,P.C.,Sreekala G.S. and Deepa S. Nair. Abstracts/extended abstracts published on "Aminoacid profiling in Milk Yam (*Ipomoea digitata* L.). " Proceedings Provectus Plantae 2019. International Conference on Exploring the Scope of Plant Genetic Resources 22-24th May 2019. Dept. of Botany, University of Kerala, Kerala, India Abstract PFP 37 pp 260-262
6. Anargha,T. and Sreekala, G.S. 2021. Defense enzymes in ginger genotypes induced by rhizome rot (*Pythium aphanidermatum* (Edson) Fitzp.) International Symposium on Spices as Flavours, Fragrances & Functional Foods held on 09-12 February 2021, Indian Society for Spices, Kozhikode, Kerala, India pp.89.
7. Sandra Merin Mathew and Sreekala G.S.2022. Economics of mulch on ginger transplanted (*Zingiber officinale* Rosc) intercropped in coconut gardens. International Seminar on Sustainable Urban Agricultural Systems and Community Resilient Cities on 22 March organised by Training Service Scheme, College of Agriculture, Vellayani

Popular Articles

1. Karshika rangathu oru samoola parivarthanam atthyntapekshitham. *Souvenir 1997, Sevagiri Resident's Association pp.63-64.*
2. Health Benefits of Coconut. *Kerala Calling*. September 1998, Volume 18(11) pp 32-34.
3. Jaivakrishireethi Kurumulakil. *Kerala Karshakan* March 2000, 45(12) pp.9-10.
4. Nalikerathil ninnum Vilayeria Vibhavagal. *Kerala Karshakan* August 2001 Vol 46(22) pp.13-14.
5. Inchiyile Vilavardhanavinu prakasa niyanthranam. *Spice India* December 2001, Vol 14(12) pp.5.
6. Inchisathum inchithylavum. *Krishikaran*. December 2006 pp.14.
7. Nanotechnology in Agriculture. *Kannimannu*. July 2007 pp.19-22.
8. Eelam Krishi-Vila muthal kayattumathi vare. *Krishikaran*. December.2010, pp 26-29.
9. Pachakarithai utpadanam . **Krishiyankanam** vol.14 (4) 2011.
10. Vasanthakumar,K. and Sreekala.G.S. 2016. Profiling Spices 1 The flavor and wellness from black pepper.Spice India 29(8): 24-30
11. Vasanthakumar, K., and Sreekala. G.S. 2016. Profiling Spices 2 Small cardamom ; The green capsule that greens life. Spice India 29(9): 12-24
12. Vasanthakumar, K. and Sreekala.G.S.2016. Arogyathinai Elam Seelamakham. Spice India Malayalam 29(9); 12-16
13. Vasanthakumar,K. and Sreekala.G.S.2016. Profiling Spices 3 The flavour and wellness from ginger. Spice India 29(11) 18-24.

Books

1. Sreekala, G.S. (ed.). 2013. *Naliker a Ulpennangal*. State Resource Centre, Kerala.
2. Sreekala, G.S.(ed) 2017.Objective Spices and Plantation Crops. Kalyani publishers, New Delhi.
3. Dr. Roy Stephen and Dr. Sreekala G.S. . (ed) 2021 Proceedings of The National Webinar on Spice Improvement, Processing, and Marketing, Director of Extension, Kerala Agricultural University

Chapters in Books

1. Mangainchi in –Sugandhathaila Marunnuchedikalum Krishireethikalum published by Kerala Agriculture University, Thrissur, 2003,pp. 64-66
2. Pathinonnam Panchavalsara Padhathi- Karshika Vikasanam Sameepanavum Nirdeangalum. 2008 All India Kisan Sabha.
3. Sreekala, G.S. Vazhaenangal. 2015. In : Usha C.Thomas, Sheela,K.R. and Allen Thomas (Eds). *Vazha Krishi Oru Vazhikatti*. pp.5-15
4. Sreekala. G.S. 2019. Coconut Tactics of Being an Agripreneur Learning the Rope (Eds. Sreedaya G.S., Seema ,S. and Anilkumar, A)

Brochure/ Technical Bulletin

1. Inchiyilum manjaliyum portray thai utpadanam – 2018. Dr. Sreekala G.S., Dr P.C. Jessykutty , Sandra Merin Mathew, Aparna K. , Narayanan Nampoothiri
2. Inchikrishi by Sreekala G.S., Sonia N.S. and Anisa, N.A. 2022.
3. Manjal Krishi by Sreekala G.S. and Deepa S. Nair.2022.

Seminars Organised / Coordinated

1. National webinar on Spice Improvement, Processing and Marketing on Oct 7th and 8th Oct, 2020
2. Seminar on Smart Farming System on 23rd March 2021
3. Seminar on molecular techniques in crop improvement- plantation crops and spices on 29th May, 2021
4. Seminar on Genome Engineering with CRISPR/CAS : the new era of crop improvement

Trainings attended

1. Attended training on Human Resources Development.
2. Attended training on Instructional Technology and Subject matter.
3. Attended Workshop on farm feature held by Farm Information Bureau.
4. Orientation course- UGC-sponsored orientation program (IT- oriented) conducted by Academic Staff College, University of Kerala, Kariavattom from 2/6/2010 to 29/6/2010
5. Training on“ **Intellectual Property Rights** ”held by Dept. of Plant Breeding and Genetics, Kerala Agricultural University, Thrissur..
6. Training on “**Natural Resource Management for Sustainable Development**”, Dept. of Agronomy, CAFTA, Tamil Nadu Agricultural University, Coimbatore from 9/2/2010 to 29/2/2012

7. Attended a short course on “**Recent Advances in Conservation of Genetic Resources of Plantation Crops**” held by CPCRI, Kasargode from 22 - 31 October 2013.
8. Advances in “**Production of quality planting materials in plantation crops**” 18-11-2014 to 27-11-2014 at CPCRI, Kayamkulam.
9. Attended training on “ **Environmental Sciences**” held by Human Resource Development Centre, UGC- Academic Staff College, Karyavattom from 2/2/17 to 22/2/17
10. Attended a National level training on “**Advances in Cocoa production and Processing Technology**” from 25/5/2017 to 27/5/2017 held at CPCRI, Vittal.
11. Attended training on “ **Breeding for resistance to pest and diseases of Plantation crops**” from 21/11/2017 to 30/11/2017 held by ICAR-CPCRI , Kayamkulam
12. Short course on' Recent Advances in Conservation and Management of Genetic Resources of Spices, Plantation , Medicinal and Aromatic Crops " by UAHS, Shivamogga from 1-10 th October, 2019.
13. DST sponsored National Online Training Programme on Soil and Water Conservation Technologies for Climate Smart Agriculture in the Conext of Extreme Weather Events from Feb 22 to March 05 , 2021 at ICAR-IISWC , Research Centre, Udhamandalam
14. National online NMPB sponsored training on „ Medicinal and Aromatic Plants Diversity Utilisation and their Conservation” Organised by Department of Forestry, Faculty of Horticulture, Uttar Banga Krishi Vishwavidyalaya, West Bengal. From 1st June, 2021 to 10 th June , 2021.

Workshop attended

1. Participated in XXI workshop of AICRP (Spice) held at NRC on seed spices, Tabiji, Rajasthan, 5-6 July 2010.
2. National workshop on techniques for chromosome analysis from 21 to 23 Nov, 2018.

Student Guidance (Major Advisor/ Advisory Committee member)

M. Sc. : Within KAU: Completed: 13 ; Ongoing - 1
Ph. D: Competed – 1 ; Ongoing : 4

Other Institutional Responsibilities

1. Currently acting as student Advisor/faculty mentor to 10 Undergraduate students.
2. Currently Technical Officer of RARS(SZ) Vellayani. Website content manager of RARS(SZ) Vellayani.

Membership in Professional Associations

1. Life Member of Indian Society for Spices , Indian Institute of Spices Research, Calicut
2. Life Member of Horticultural Society of India
3. Life Member of South Indian Horticultural Association , Horticultural College and Research Institute , Coimbatore