Dr. R.V.Manju
Professor and Head
Dept. of Plant Physiology

Address:

Kausthubham, TC 29/1420(1) ,Palkulangara,
Thiruvananthapuram, Kerala, 695 024, India

Phone: +91 9447903187

Email: manju.rv@kau.in

Summary

I did my postgraduation and Ph.D. in Crop Physiology at the Department of Crop Physiology, University of Agricultural Sciences, GKVK, Bangalore. I had the good fortune of working under the guidance of Dr V.R. Sasidhar, who is a prominent scientist in the field of stress physiology in India. I also had the opportunity to work with the legendary Dr. Udayakumar who taught us the importance of team work and camaraderie in the department. At UAS I got introduced to the wonderful world of chemical signals in root- shoot communication in plants under stress conditions. The greatest hurdle at that time was the quantification of plant hormones and therefore we ventured into developing strategies to quantify cytokinins. The best option was found to be immuno quantification of the same for which we raised antibodies against conjugated cytokinins in rabbits in-house, which was a great accomplishment. Scientists from various other institutions employed our technique to decipher the hormonal basis of various plant physiological processes. Analysis of the molecular regulation of cytokinins, through Cytokinin oxidase formed the basis of my Ph. D. work which comprised a unique combination of immunochemistry, physiology and molecular biology techniques. My field of interest continues to be the expositions of plant responses to various abiotic stress factors. However currently I focus on the impacts of increasing atmospheric Carbon dioxide and associated abiotic stress factors on crop plants which has got serious implications in the face of climate change.

Research Highlights/Key research areas

- Development of Polyclonal antibodies against three groups of cytokinin hormone namely trans-Zeatin Riboside, Dihydroxy Zeatin Riboside and Isopentenyl Adenosine. Standardization of Enzyme linked Immunosorbant Assays (ELISA) using the developed antibodies.
- Nutrio-physiological and molecular analyses of coconut palms affected with foliar yellowing
- Establishment of **OPEN TOP CHAMBER SYSTEM-** for CO_2 enrichment simulation studies **(**which helps to study the impact of rising atmospheric CO_2 through a holistic approach**)** for the first time in KAU at College of Agriculture, Vellayani. Elevated CO_2 induced modifications on the phenology, nutrient dynamics, yield, quality and defence mechanisms of selected crops are being carried out.

.

Experience

Joined Kerala Agricultural University as Assistant Professor (Plant Physiology) in the year 1999

Education

- Graduated in Agricultural Science from Kerala Agricultural University (1988)
- Post Graduation in Crop Physiology from University of Agricultural Sciences, GKVK, Bangalore (1991)
- Ph.D in Crop Physiology from University of Agricultural Sciences, GKVK, Bangalore(1997)

Area of Specialisation

- Climate change (CO_2 enrichment simulation studies), Stress Physiology

Awards & Recognitions

- **Gold medal** (First rank) for Ph. D. Programme –University of Agricultural Sciences, Bangalore,1997
- **Certificate of Appreciation** for securing External Funded Project, Kerala Agricultural University,2005

Research Projects

Projects completed [as Principal Investigator]		
Name of Project	Funding Agency	Outlay(lakhs)
Molecular and physiological analyses of banana clones	KSCSTE	9.04
Screening for the drought adaptive, wax biosynthesis *cer6* gene in Nendran banana clones	Kerala Biotechnology Commission	15.1
Impact of weather factors on the flowering behaviour of popular varieties of mango (Northern Zone)	Planning Board	7.38
Crop weather relation and physiology in cow pea (*Vigna unguiculata*)	Planning Board	9.75
Crop response studies using open top chambers in selected crops	Planning Board	47.50
Strengthening the facility for CO_2 enrichment simulation studies	Planning Board (Station wise funding)	1.50
Impact of micronutrients and growth regulators on the quality and shelf life of tomato (Solanum lycopersicum L.)	Planning Board (Station wise funding)	1.00

Publications

1. Paul, A., NS, Radhika, **RV, Manju**. and Johnson, J.M., 2023. Beneficial Fungal Root Endophyte *Piriformospora indica* Diminishes Yield Loss Without Compromising Quality of Banana Fruits Due to Banana bract mosaic virus Infection through Better Soil Nutrient Mobilization. *International Journal of Plant & Soil Science*, 35(19), pp.1397-1415. **(NAAS-5.07)**
2. Sinija Das K., Joy Michal Johnson, Radhika N.S. and **Manju R.V**. 2023. *Piriformosporaindica* - root colonization improved the shelf life and quality parameters of ripe and unripe fruits of banana var. Nenrdan . Biological Forum- An International Journal. 15(8a):62-70. **(NAAS -5.11)**
3. Bhavya, M.S.P., **Manju, R.V**., Viji, M.M., Roy, S., Anith, K.N. and Beena, R., 2023. Impact of biofertilisers on iron homeostasis and grain quality in the rice variety Uma under Elevated CO_2. Frontiers in Plant Science, 14, p.1144905. **(NAAS 11.75)**

4. Nasreena, C., Alex, S., Soni, K.B., Dinkar, D.M., Kiran, A.G. and **Manju, R.V**., 2023. Selection of stable housekeeping genes for gene expression studies in different varieties of black pepper (*Piper nigrum* L.). Plant Science Today, 10(3), pp.26-36. **(NAAS 5.44)**
5. Raj, A.B., John, J., Pillai, P. S., Meera, A. V., **Manju R. V.**, and Sudha, B. 2023. Alternative Cropping Systems to mitigate Carbon dioxide emission in rice fields under different nutrient levels. *Int. J. Environ. Clim.* 13(9): 540-546**. (NAAS 5.13)**
6. Amrutha, E.A., **Manju, R.V**., M.M. Viji., Roy, S., Jacob John., Alex, S. and A.V. Meera., 2023. The Influence of Biofertilizers on Growth and Yield of Rice (*Oryza sativa* L.). Biological Forum – An International Journal, 14(4a):23-28 **(NAAS- 5.11)**
7. Arunima, A.S., **Manju, R.V**., Viji, M.M., Roy, S., Sarada, S. and Beena, R. 2022. Impacts of nutrients and biofertilizers in tomato under elevated CO_2 induced temperature condition. Journal of Crop and Weed. 18(1): 45-49. **(NAAS 5.46)**
8. Lekshmi, S.G., Mini, C. and **Manju, R.V**., 2021. Post harvest quality parameters of papaya stored in Zero Energy Cool Chamber under humid tropics. *Journal of Tropical Agriculture*, *59*(1). **(NAAS- 4.85)**
9. Nithya, N., Beena, R., Abida, P.S., Sreekumar, J., Stephen, R., Jayalekshmi, V.G., **Manju, R.V.** and Viji, M.M., 2021. Genetic diversity and population structure analysis of bold type rice collection from Southern India. *Cereal Research Communications*, *49*, pp.311-328. **(NAAS 6.85)**
10. Raghunath, M., Beena, R., Mohan, V., Viji, V., **Manju, R**. and Stephen, R., 2021. High temperature stress mitigation in rice (Oryza sativa L.): Foliar application of plant growth regulators and nutrients. *Journal of Crop and Weed*, *17*(1), pp.34-47. **(NAAS 5.46)**
11. Reshma, M., Beena, R., Viji, M., **Manju, R**. and Roy, S., 2021. Validation of temperature induction response technique on combined effect of drought and heat stress in rice (Oryza sativa L.). *Journal of Crop and Weed*, *17*(2), pp.119-28. **(NAAS 5.46)**
12. Vijayakumar, A., Shaji, S., Beena, R., Sarada, S., Rani, T.S., Stephen, R., **Manju, R.V**. and Viji, M.M., 2021. High temperature induced changes in quality and yield parameters of tomato (*Solanum lycopersicum* L.) and similarity coefficients among genotypes using SSR markers. *Heliyon*, *7*(2), p.e05988. **(NAAS 9.78)**
13. Jaslam,P.M., Rejeth, R., Jayalekshmy, V.G., Roy, S., **Manju, R.V**., Mary Viji, M.M. and Siddique, K.M. 2021. Association mapping of drought tolerance and agronomic traits in rice (*Oryza sativa* L.) landraces. *BMC Plant Biology*:21(1):1-21. 10.1186/s12870-021-03272-3: **(NAAS 11.26)**
14. Mohan, M., Anitha, N. and Manju, R.V., 2020. Host resistance in brinjal to mealybug *coccidohystrix insolita* (Green). *Indian journal of Entomology,* 82(4):871-874. **(NAAS-5.89)**
15. Manasa, R., **Manju, R.V**., Stephen, R., Viji, M.M., Beena, R. and Sreekala, G.S., 2020. Growth and Yield responses of Ginger (Zingiber officinale Rosc.) varieties to Elevated CO2. *Chem. Sci. Rev. Lett*. **(NAAS 4.75)**
16. Beena, R., Kirubakaran, S., Nithya, N., Manickavelu, A., Sah, R.P., Abida, P.S., Sreekumar, J., Jaslam, P.M., Rejeth, R., Jayalekshmy, V.G. and Roy, S. **Manju, R.V**. , Viji M.M.,Siddique H.M.2021. Association mapping of drought tolerance and agronomic traits in rice (*Oryza sativa* L.) landraces. *BMC Plant Biology*, *21*(1), pp.1-21**. (NAAS-11.26)**
17. Manikanta, C.L., Beena, R., Stephen, R., **Manju, R.V**., Viji, M.M. and Alex, S., 2020. Physio morphological plasticity of rice (Oryza sativa L.) genotypes exposed to water-stress. *Journal of Tropical Agriculture*, *58*(1). **(NAAS 4.75)**
18. Rejeth, R., Manikanta, C.L., Beena, R., Stephen, R., **Manju, R.V**. and Viji, M.M., 2020. Water stress mediated root trait dynamics and identification of microsatellite markers associated with root traits in rice (Oryza sativa L.). *Physiology and Molecular Biology of Plants*, *26*, pp.1225-1236. **(NAAS 9.02)**

19. Nithya, N., Beena, R., Stephen, R., Abida, P.S., Jayalekshmi, V.G., Viji, M.M. and **Manju, R.V**., 2020. Genetic variability, heritability, correlation coefficient and path analysis of morphophysiological and yield related traits of rice under drought stress. *Chemical Science Review and Letters*, *9*(33), pp.48-54. **(NAAS 4.75)**
20. Wagh, Y.S., Viji, M.M., Soni, K.B., Jadhav, P.R., Ekatpure, S.C., **Manju, R.V**., Stephen, R. and Beena, R., 2020. Isolation of RNA from Grains of Medicinal Rice "Njavara" using Improved TRIzol Method. *Int. J. Curr. Microbiol. App. Sci*, *9*(9), pp.2858-2866**. (NAAS-5.38)**
21. Srikanth G. A., **Manju R. V.** Roy S. Viji M. M. Beena R. Geetha Lekshmi R. Manasa R. and Ghade R. 2019. Carbon dioxide enrichment induced modification in the developmental pattern of cowpea (*Vigna unguiculata* L.) variety Vellayani Jyothika. *Journal of Agriculture Sciences*11.2: 7761-7763. **(NAAS 4.20)**
22. Gayathri R., Roy S., Viji M. M., Beena R. and **Manju R.V**. 2018. Sterility modulation in TGMS system using plant growth regulators for hybrid rice production. *International Journal of Agriculture Sciences* 10(24): 7671-7674. **(NAAS 4.82)**
23. Roy stephen, **Manju R. V**., Lali R., Lini J. J., Anila B. S., Vipin Mohan and Gayathri R. 2018. Male gametophytic selection- a novel technique for water stress tolerance in black Pepper (*Piper nigrum*). *Int. J. Agri. Sci.* 10: 6700-6702. **(NAAS 4.82)**
24. Chatti, D. and **Manju, R. V**. 2017. Growth parameters contribution to increased drought tolerance rresponce in Amaranthus (*Amaranthus tricolor* L.) under elevated carbon dioxide. *Cem. Sci. Rev. Lett.* 6(23): 1984-1989**. (NAAS- 4.75)**
25. Chatti, D. and **Manju, R**. V. 2017. Physiological basis of varietal response of Amaranthus (*Amaranthus tricolor* L.) to water stress condition and their modification under elevated CO_2 environments. *Cem. Sci. Rev. Lett.* 6(23):1990-1997. **(NAAS-4.75)**
26. Chatti, D. and **Manju, R. V**. 2017. Carbon dioxide enrichment induced drought tolerance response in Amaranthus (*Amaranthus tricolor* L.). *Cem. Sci. Rev. Lett.* 6(23): 2019-2024. **(NAAS- 4.75)**
27. Chatti, D. and **Manju, R. V**. 2017. Physiological and molecular analyses of drought tolerance response in Amaranthus (*Amaranthus tricolor* L.) under elevated carbon dioxide environment. *Cem. Sci. Rev. Lett.* 6(23): 2025-2031. **(NAAS- 4.75)**
28. Amogh P. Kumar, Paul Lazarus,T, Santha,A.M, Brijit Joseph and **Manju,R.V**, 2017. Impact of climate change on black pepper production in Idukki and Waynad districts of Kerala. *International journal of current research*. 9(06): 52960-52963**. (NAAS-2.78)**
29. Sreeja, R., Viji, M. M., **Manju, R. V**., Stephen, R., and Deepa, S. 2016. Effect of certain growth regulators on flowering, fruit set, plant growth and yield components of chilli (*Capsicum annuum* L.). *Adv. Life Sci.* 5(23): 11061-11063**. (NAAS-3.15)**
30. Sreeja, R., Viji, M. M., **Manju, R. V**., Stephen, R., and Deepa, S. 2016. Physiological, biochemical and yield variations in chilli (*Capsicum annumm* L.) as influence by different growth regulators. *Adv. Life Sci.* 5(21): 9901-9904. **(NAAS-3.15)**
31. Deepa, S., Manju, R.V., Stephen, R. and Viji, M.M., 2016. Physiological Analyses of Coconut Palms (*Cocos nucifera* L.) Affected with Foliar Yellowing. *Journal of Plant Science Research*, *32*(1**). (NAAS- 5.44)**
32. Deepa, S., **Manju, R. V**., Stephen, R., and Viji, M. M. 2016. Mid whorl yellowing induced physiological and anatomical alterations in coconut palms (*Cocos nucifere* L.). *Adv. Life Sci.* 5(7): 6907-6910. **(NAAS-3.15)**
33. Jacob, L., **Manju, R. V**., Stephen, R., Vijji, M. M., and Reghunath, B. R. 2015. Effect of abiotic stress factors on growth, physiology and total withanolide production in *Withania somnifera* (L.) Dunal. *J. Med. Aromat. Plant Sci.* 37(1-4): 18-21. **(NAAS -4.97)**
34. Amith, P. K., Mini, C., and **Manju, R. V**. 2015. Protocol development for minimally processed pomegranate Arils. *Int. J. Processing and Post Harvest Technol.* 6(1): 62-68**. (NAAS-3.84)**

35. George, G. M., Geetha Lekshmi, P. R., Mini, C., Anith, K. N., and **Manju, R. V**. 2015. Evaluation of sanitization treatment for red amaranthus (*Amaranthus tricolor* L.). *Int. J. Processing and Post Harvest Technol.* 6(2): 144-149**. (NAAS-3.84)**
36. Amith, P. K., Mini, C., **Manju, R. V**., and Geetha Lekshmi, P. R. 2015. Protocol development for fresh-cut pineapple. *Int. J. Agric. Sci. Vet. Med.* 3(1): 110-116. **(NAAS-6.71)**
37. Niya Celine, V. J., Stephen, R., **Manju, R. V**., and Shabana, R. 2014. Phenological, Morpho-agronomic and floral characterization of promising thermosensitive genic male sterile rice (*Oryza sativa* L.) line suitable for Kerala. *J. Plant Sci. Res.* 30(2): 133-139**. (NAAS-5.44)**
38. **Manju, R. V**., Edison, L. K., Anu, K., and Stephen, R. 2014. Comparison of RNA extraction protocols for good quality RNA from Nendran banana leaves. *Trends in Biosci.* 7(17): 2459-2462. **(NAAS-3.93)**
39. Niya Celine, V. J., Stephen, R., **Manju, R. V**., and Shabana, R. 2014. Evaluation of thermosensitive genic male sterile line in rice suitable to Kerala through marker assisted selection. *J. Trop. Agric.* 52(1): 74-78. **(NAAS-3.49)**
40. Jacob, L., **Manju, R. V**., Stephen, R., Vili, M. M., and Edison, L. K. 2014. Alteration in withanolide production in *Withania Somnifera* (L.) Dunal under low light stress. *J. Plant sci. Res.* 30(2): 19-121**. (NAAS-6.72)**
41. Jacob, L., **Manju, R. V**., Stephen, R., Vili, M. M., and Edison, L. K. 2014. Stress induced enhancement of secondary metabolite production in *Withania somnifera* (L.). *Int. J. Trop. Agric.* 32(3-4):617-620. **(NAAS-3.94)**
42. **Manju, R.V**. and Sony, K.B., 2011. Identification of morpho-physiological traits contributing towards water stress tolerance in Nendran clones. *Climate Change Adaptation Strategies in Agriculture and Allied Sectors*, p.255
43. Manju, R.V., Kulkarni, M.J., Prasad, T.G., Sudarshana, L. and Sashidhar, V.R., 2001. Cytokinin oxidase activity and cytokinin content in roots of sunflower under water stress. *Indian J. of Exp. Biol.*39:786-792 **(NAAS-6.82)**
44. Abida, P.S., Sashidhar, V.R., **Manju, R.V**., Prasad, T.G. and Sudharshana, L., 1994. Root-shoot communication in drying soil is mediated by the stress hormones abscisic acid and cytokinin synthesized in the roots. *Current science (Bangalore)*, *66*(9), pp.668-672**. (IF-1.169)**

GenBank Submissions:

Manju R.V. and Lekshmi E.K.: 5

Student guidance (Major Advisor/Advisory committee member)

As Major advisor

M. Sc.

Completed: 12

Ongoing: 1

Ph. D

Completed:4

Ongoing:1

B.Sc.-M.Sc.(Int) Biotechnology students

Completed: 3

Ongoing:1

As Advisory committee member

M.Sc. -34

Ph. D - 24

Other Institutional Responsibilities undertaken

- As Head, Department of Plant Physiology
- As member, PC group (Farming Systems Research)
- As Academic Officer (PG)
- As Joint Secretary, Parent Teachers Association, College of Agriculture, Vellayani
- As member, Student Counselling team

Membership in Professional Associations

- Life membership in The Indian Science Congress Association