

## **BIODATA**

**Name** : **Dr. Seema Singh**

**Fathers Name** : **Late Dr. Foja Singh**

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**Nationality** : **Indian**

**Date of Birth** : **03-09-1974**

**Place of Birth** : **Bangaluru, Karnataka, India**

**Title of Thesis** : **Micropropagation and Genetic Conformity in Garden Petunia.**

**Field of Research** : **Plant Tissue Culture & Genetic amelioration of important plant species, conservation of rare and threatened plants endemic to Kashmir Himalaya.**

### **RESEARCH GUIDANCE**

<b>S. No.</b>	<b>Number Enrolled</b>	<b>Thesis Submitted</b>	<b>Degree awarded</b>
M.Phil	-	0	<b>06</b>
Ph.D.	04	01	<b>06</b>

### **PROJECTS**

<b>S. No.</b>	<b>TITLE OF THE PROJECT</b>	<b>FUNDING AGENCY</b>	<b>AMOUNT SANCTIONED (RS)</b>	<b>Duration</b>	<b>STATUS</b>
<b>1.</b>	<i>In vitro</i> propagation and ecorestoration of two endangered, medicinal orchids of Kashmir Himalaya, <i>Malaxis muscifera</i> (Lindl.) Kuntze and <i>Listera ovata</i> (Linn.)R.Brown.	DBT (Bio CARE ) New Delhi	33,72,082.00	03 Years	Completed

2.	<i>In vitro</i> propagation and effect of AM fungal association on establishment and growth performance of <i>Gentiana kurroo</i> Royle. A threatened medicinal plant growing in Kashmir Himalaya	University Grants Commission New Delhi	14,52,500	03 Years	Completed
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### PROJECT MENTORSHIP

Title of the project	Faculty Name	Acting as	PI name	Funding Agency	Dated	Amount Sanctioned
Bioprospecting of <i>Polygonatum Verticillatum</i> through advanced tissue culture techniques	Dr Seema Singh	Mentor	MISS JasfeedaQadir	DST	21/12/2018	13,80,000

### RESEARCH FELLOWSHIPS/AWARDS/HONOURS

1. Awarded DBT-BIOCARE Project (2013) entitled *In vitro* propagation and ecorestoration of two endangered, medicinal orchids of Kashmir Himalaya, *Malaxis muscifera* (Lindl.) Kuntze and *Listeraovata* (Linn.)R.Brown.
2. Awarded DST Fellowship (2013) Orchid related research at Orchid Lab, Panjab University Chandigarh (2013).
3. Awarded INSA visiting scientist fellowship (2014) at School of Life sciences, Jawaharlal Nehru University, New Delhi.

### CONTRIBUTION TOWARDS CORPORATE LIFE AND MANAGEMENT OF THE INSTITUTION

- Member, Kashmir University Botanical Garden.
- Member SAP Committee, Department of Botany.
- Member Departmental Research Committee Department of Botany & Bio-resources.
- Member Board of Undergraduate Studies in Botany.
- Member Board of Postgraduate Studies in Botany and Bio-resources.
- Member women Empowerment Committee University of Kashmir.
- Member Sports Committee University of Kashmir.
- Member Cultural Committee University of Kashmir.
- Kashmir University Teachers Association , Executive committee member.
- Coordinator, J&K SET agency.
- Member Purchase Committee University of Kashmir.
- Member Task Force Committee, GATI Pilot programme.
- Member of Gender Audit Committee.
- Member Purchase Committee CCPC.

### **EXAMINATION WORK ATTENDED**

- Conduct of M. Phil & PG level examinations in Botany Department.
- Conduct of PG Practical Examination as Internal Examiner in Botany.
- Conduct of PG entrance examination in the University of Kashmir.
- Setting of PG level question papers in Botany.
- Evaluation of PG Botany and Bio-resources papers.

### **MEMBER OF SCIENTIFIC SOCIETIES**

- Life Member of The orchid society of India (Chandigarh)
- Life Member of The Society for Plant Biochemistry and Biotechnology(India)

### **COURSES/SEMINARS/CONFERENCES ATTENDED**

1. National Symposium on prospect and potential of plant biotechnology in India in the 21<sup>st</sup> Century , organized by Department of Botany ,University of Jodhpur, Rajasthan, India. (2000)
2. National Seminar on “Recent advances in Plant Science Research,” organized by Department of Botany University of Kashmir, Hazratbal, Srinagar. (October 12-14, 2003)
3. 4<sup>th</sup> JK Science Congress, University of Kashmir, Hazratbal, Srinagar in collaboration with J&K State Council for Science and technology, DST GOI & CSIR GOI, (November 12-14, 2008)
4. National Conference on Biodiversity: Present Status and Future Challenges. Organized by Department of Botany University of Kashmir, Hazratbal Srinagar (March 12-14, 2009)
5. 6<sup>th</sup> JK Science Congress on Science, Technology and Sustainable Development, organized by University of Kashmir, Srinagar in collaboration with Department of Science and Technology, Govt. of India and Jammu and Kashmir Academy of Sciences (Dec. 2-4, 2010)
6. 2 days short term course on research methodology in nano sciences organized by UGC Academic Staff College University of Kashmir from 9<sup>th</sup> December to 10<sup>th</sup> December 2011
7. World Arbour Day Celebrations organized by Department of Botany University of Kashmir Hazratbal Srinagar (March 22nd, 2011)
8. International Day for Biodiversity organized by Department of Botany University of Kashmir Hazratbal Srinagar (May 23<sup>rd</sup>, 2011)
9. Workshop on Sustainable Utilization of Medicinal and Aromatic Plants of Kashmir Himalaya for Regional Development organized by Department of Botany University of Kashmir Hazratbal Srinagar (Oct. 15, 2011)
10. National Conference on Orchids in India: Diversity, Characterization and Resource Development for community Livelihood & Orchid Show. Organized by National Academy of Sciences India (NASI) Allahabad and TOSI Chandigarh at (NASI) Allahabad (Dec. 21-23, 2011)
11. 18 days refresher course in research methodology in sciences organized by UGC Academic Staff College University of Kashmir from 16<sup>th</sup> Jan 2012 to 8<sup>th</sup> Feb -2012.
12. 8<sup>th</sup> JK Science Congress on Science, Technology & Regional Development:

- Opportunities & Challenges organized by University of Kashmir in collaboration with State Council of Science and Technology (Sep. 17- 19 2012).
13. International Conference on Industrial Biotechnology, 9<sup>th</sup> convention of Biotech Research society, India and Indo- Italian workshop on Food Biotechnology; Industrial Processing, safety and health Organized by Department of Biotechnology Punjabi University Patiala (Nov. 21-23, 2012).
  14. National dialogue on Orchid Conservation & Sustainable Development for Community Livelihood organised by National Research Centre for Orchids, Pakyong-Sikkim in collaboration with The Orchid Society of India-Chandigarh at Chintan Bawan Gangtok-Sikkim (March 8-9, 2013).
  15. International Day for Biodiversity organized by Department of Botany University of Kashmir Hazratbal Srinagar (May 22<sup>nd</sup>, 2013).
  16. Innovations in Science Pursuit for Inspired Research (INSPIRE-2013) organised by Department of Botany University of Kashmir (September 7-11, 2013).
  17. National Conference on Plant Biology-Plants, People and Planet-NCPB(2013) Organized by Department of Botany Bangalore University (September 24-27<sup>th</sup> 2013).
  18. National Science Day-2013 “Genetically Modified Foods and Food Security” Organized by Department of Botany University of Kashmir, Srinagar. (14<sup>th</sup> of September 2013).
  19. 9<sup>th</sup> JK Science Congress & Regional Science Congress on Innovations and Advances in Science and Technology organized by University of Kashmir (October 1-3, 2013).
  20. International workshop on “Optimization Techniques & Softwares” in Conjunction with 46<sup>th</sup> Annual convention of Operational Research Society of India (ORSI) Organized by Department of Statistics University of Kashmir (October 19-23, 2013).
  21. Science Academies Lecture Workshop “Himalayan Biodiversity and Bioresources: Mapping, Utilization and Conservation” Organized by Department of Botany University of Kashmir, Indian Academy of Sciences (Bangalore), Indian National Science Academy (New Delhi) and National Academy of Sciences (Allahabad, May, 08-10 2014).
  22. National Conference on *Orchids Science and Commerce: Integration of Medicinal Orchids, Sustainable Development and Societal Benefits & Orchid Show*, organized The orchid society of India (TOSI), Department of Botany, Panjab University, Chandigarh – 160 014 (u.t.) jointly with School of Biotechnology, Shri mata vaishno Devi (SMVD) University, Kakryal, Katra- 182 320 (J&K-, February 13-15, 2015).
  23. 10<sup>th</sup> JK Science Congress. Science and Technology for Inclusive Development: A Way Forward. Organized by University of Jammu and J&K State Council for science and Technology. March 14-16, 2015.
  24. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. April 1-2, 2015.

25. 11<sup>th</sup> JK Science Congress. Scientific, Social & Economic Dimensions of Climate Change. Organised by University of Kashmir and J&K State Science, Technology & Innovation Council and Department of Science & Technology, Govt of India. October 12-14, 2015

#### ABSTRACTS PRESENTED/PUBLISHED

1. Gowhar A. Shapoo, Zahoor A. Kaloo & **Seema Singh**. *In vitro* seed germination and Protocorm development in *Spiranthes lancea*. 6<sup>th</sup> JK Science Congress on Science, Technology and Sustainable Development organised by University of Kashmir, Srinagar in collaboration with Department of Science and Technology, Govt. of India and Jammu and Kashmir Academy of Sciences. 2-4 Dec. 2010.
2. Gowhar A. Shapoo, Zahoor A. Kaloo, **Seema Singh** and Burhan M. Padder. *In vitro* seed germination and development of Protocorms in two orchid species- *Epipactis royleana* Lindl. and *Dactylorhiza hatagirea* D. Don Soo, growing in Kashmir Himalaya. National conference on orchids in India: Diversity, Characterization and Resource Development for Community Livelihood & Orchid show at National Academy of Sciences (NASI) – Allahabad, organised by The Orchid Society of India (TOSI) Department of Botany, Panjab University, Chandigarh & National Academy of Sciences – Allahabad, India 21-23 Dec. 2011.
3. Gowhar A. Shapoo, Zahoor A. Kaloo and **Seema Singh**. Micro propagation and conservation of important medicinal and aromatic plants. Workshop on Sustainable Utilization of Medicinal and Aromatic Plants of Kashmir Himalaya in Regional Development. Organized by Department of Botany University of Kashmir Srinagar assisted by UGC, New Delhi under SAP Programme 15 Oct. 2011.
4. Gowhar A. Shapoo, Zahoor A. Kaloo, **Seema Singh**, Aijaz H. Ganie, Burhan M. Padder, Samar Amin and Tabinda Altaf. Distribution, habit, habitat and importance of some orchid species growing in Kashmir Himalaya. 8<sup>th</sup> JK Science Congress on Science, Technology & Regional Development: Opportunities & Challenges organized by Kashmir University in Collaboration with State Council of Science and Technology 17- 19 Sep 2012.
5. Burhan M. Padder, Zahoor A. Kaloo, **Seema Singh** and Gowhar A. Shapoo. “*In vitro* regeneration of *Epipactis helleborine* a medicinally important Orchid”. 8<sup>th</sup> JK Science Congress “Science, Technology and Regional Development: Opportunities and Challenges” Organised by Kashmir University in collaboration with State Council of Science and Technology, 17-19 Sept. 2012.
6. Samar Amin, Zahoor A. Kaloo, **Seema Singh** and Tabinda Altaf. BAP induced Callus production in *Inula royleana* DC. - an important medicinal plant of Kashmir Himalaya. 8<sup>th</sup> JK Science Congress on Science, Technology & Regional Development: Opportunities & Challenges organized by University of Kashmir in collaboration with State Council of Science and Technology 17-19 Sep 2012.

7. Tabinda Altaf ,Zahoor A. Kaloo, **Seema Singh**, Samar Amin,Gowhar A. Shapoo and Burhan M. Padder. Somatic embryogenesis from Corolla explants in *Gentiana kurroo* **Royle**.8<sup>th</sup> JKScience Congress on Science, Technology & Regional Development: Opportunities & Challenges organized by university of Kashmir in collaboration with StateCouncil of Science andTechnology 17- 19 Sep 2012
8. Tabinda Altaf,Zahoor A. Kaloo, **Seema Singh**, Samar Amin, Gowhar A. Shapoo and Burhan M. Padder. Effect of growth medium on *in vitro* seed germination in *Gentiana kurroo***Royle**. 8<sup>th</sup> JKScience Congress on Science, Technology & Regional Development: Opportunities &Challenges organized by Kashmir University in collaboration with State Council of Science and Technology 17- 19 Sep 2012.
9. Samar Amin, Zahoor A. Kalooand **Seema Singh**.*In vitro* studies on *Inula royleana* **DC.**- a threatened medicinal herb native to Kashmir Himalaya. *International Conference on Industrial Biotechnology, 9<sup>th</sup>convention of Biotech Research society, India and Indo- Italian workshop on Food biotechnology; Industrial Processing, safety and health organized by Department of Biotechnology Punjabi University Patiala 21-23 Nov 2012.*
10. Tabinda Altaf, Zahoor A. Kaloo, **Seema Singh** and Gowhar A. Shapoo.Micropropagation of *Gentiana kurroo***Royle** through *in vitro*Seed germination - a threatened endemic medicinal herb of Kashmir Himalaya.*International Conference on Industrial Biotechnology, 9<sup>th</sup> Convention of Biotech Research society, India and Indo-Italian workshop on Food biotechnology; Industrial Processing, safety and health organised by Department of Biotechnology, Punjabi University Patiala 21-23 Nov2012*
11. Gowhar A. Shapoo,Zahoor A. Kaloo, **Seema Singh**, Aijaz H. Ganie, Burhan M. Padder, Samar Amin and Tabinda Altaf.Evaluation of diversity and habitat types of some orchid species growing in Kashmir Himalaya.*National Dialogue on Orchid conservation and sustainable Development for community Livelihood. at Sikkim Organised by National Research Centre for Orchids, Pakyong and TOSI Chandigarh India. 8-9 March 2013*
12. Burhan M. Padder, Zahoor A. Kaloo, **Seema Singh** and Gowhar A. Shapoo. Role of tissue culture in mass multiplication of temperate orchids of Kashmir Himalaya: A Review. *National Dialogue on Orchid conservation and sustainable Development for community Livelihood. at Sikkim Organised by National Research Centre for Orchids, Pakyong and TOSI Chandigarh India. 8-9 March 2013*
13. Burhan M. Padder, Zahoor A. Kaloo, **Seema Singh** and Gowhar A. Shapoo. Micro propagation of Orchids growing in Kashmir Himalaya. *National Dialogue on Orchid conservation and sustainable Development for community Livelihood. at Sikkim Organised by National Research Centre for Orchids, Pakyong and TOSI Chandigarh India. 8-9 March 2013*

14. Gowhar A. Shapoo, Zahoor A. Kaloo, **Seema Singh** and Aijaz H. Ganie. *Habitat diversity, importance, ex situ propagation and conservation strategies of some orchid species growing in Kashmir Himalaya* On international day for Biological Diversity Organized by Department of Botany, University of Kashmir, Srinagar (May 22<sup>nd</sup>, 2013, **Received 2<sup>nd</sup> prize in Poster Presentation.**)
15. Gowhar A. Shapoo, Zahoor A. Kaloo, **Seema Singh**, Aijaz H. Ganie and Burhan M. Padder. Diversity, ethno botanical importance and *ex situ* conservation strategies of temperate orchids growing in Kashmir Himalaya. *National Conference on Plant Biology "Plants, People and Planet"* Organised by Department of Botany Bangalore University. 24-27 September 2013.
16. Burhan M. Padder, Zahoor A. Kaloo, **Seema Singh**, Gowhar A. Shapoo and Mudasar Ganaie. *In vitro* asymbiotic germination of immature seed and protocorm formation in *Dactylorhiza hatagirea* (D.DON) Soo. *National Conference on Plant Biology "Plants, People and Planet"* Organised by Department of Botany Bangalore University. 24-27 September 2013.
17. Gowhar A. Shapoo, Zahoor A. Kaloo, **Seema Singh**, Aijaz H. Ganie and Burhan M. Padder. Rapid *in vitro* protocol for seed germination and development of Protocorm Like Bodies in *Oreorchis micrantha* Lindl.-An important orchid species of Kashmir Himalaya. *9<sup>th</sup> JK Science Congress & Regional Science Congress "Innovations and Advances in Science and Technology"*. Organised by University of Kashmir in Collaboration with JK State Council for Science and Technology & DST Govt. of India. 1-3 October 2013.
18. Burhan M. Padder, Zahoor A. Kaloo, **Seema Singh**, Meenaza Manzoor, Gowhar A. Shapoo and Mudasar Ganaie. Auxin induced germination and seedling development from rhizome sections of *Spiranthes sinensis* (Pers.) Ames: A Vulnerable orchid of Kashmir Himalaya. *9<sup>th</sup> JK Science Congress & Regional Science Congress "Innovations and Advances in Science and Technology"*. Organised by University of Kashmir in Collaboration with JK State Council for Science and Technology & DST Govt. of India. 1-3 October 2013.
19. Mahroofa Jan, **Seema Singh**, Zahoor A. Kaloo and Farhana Maqbool. Multiple shoot induction from leaf explants of *Ajuga bracteosa* Wall ex Benth. an important medicinal plant growing in Kashmir Himalaya. *9<sup>th</sup> JK Science Congress & Regional Science Congress "Innovations and Advances in Science and Technology"*. Organised by University of Kashmir in Collaboration with JK State Council for Science and Technology & DST Govt. of India. 1-3 October 2013.
20. Sabreena Rashid, Zahoor A. Kaloo, **Seema Singh** and Iram Bashir. *In vitro* plantlet regeneration from embryo culture of *Rheum webbianum* Royle-A threatened alpine medicinal plant of Kashmir Himalaya. *9<sup>th</sup> JK Science Congress & Regional Science Congress "Innovations and Advances in Science and Technology"*. Organised by University of Kashmir in Collaboration with JK State Council for Science and Technology & DST Govt. of India. 1-3 October 2013.

21. Gowhar A. Shapoo, Zahoor A. Kaloo, **Seema Singh**, Aijaz Hassan Ganie and Burhan M. Padder. Some Orchid species of Kashmir Himalaya and their economic importance. National Conference on Orchids- Conservation, Improvement and Sustainable Development, organized by TOSI jointly with and at Kerala Agriculture University, Vellanikkara, Thrissur (Kerala), 13-15, March 2014.
22. Burhan M. Padder, Zahoor A. Kaloo, **Seema Singh**, Gowhar A. Shapoo Mudasar Ganaie. *In vitro* asymbiotic seed germination leading to protocorm formation in *Cephalanthera longifolia*(L.)Fritsch an endangered orchid of Kashmir Himalaya.National Conference on *Orchids- Conservation, Improvement and Sustainable Development*, organized by TOSI jointly with and at Kerala Agriculture University, Vellanikkara, Thrissur (Kerala), 13-15, March 2014.
23. Gowhar A. Shapoo, Zahoor A. Kaloo, Aijaz Hassan Ganie, **Seema Singh**, and Burhan M. Padder. Phenotypic variability in relation to altitude in *Dactylorhiza hatagirea* D. Don (Soo), an important orchid species growing in Kashmir Himalaya. National Conference on *Orchids Science and Commerce: Integration of Medicinal Orchids, Sustainable Development and Societal Benefits & Orchid Show*, organized The orchid society of India (TOSI), Department of Botany, Panjab University, Chandigarh – 160 014 (u.t.) jointly with School of Biotechnology, Shri mata vaishno Devi (SMVD) University, Kakryal, Katra- 182 320 (J&K)- 13-15, February 2015.
24. Burhan M. Padder , Zahoor A. Kaloo, **Seema Singh**, Meenaza Manzoor, Mudasar Ganaie and Gowhar A. Shapoo. Auxin induced germination and plantlet regeneration via rhizome section culture in *Spiranthes sinensis* (Pers.)Ames: A vulnerable medicinal orchid of Kashmir Himalaya National Conference on *Orchids Science and Commerce: Integration of Medicinal Orchids, Sustainable Development and Societal Benefits & Orchid Show*, organized The orchid society of India (tosI), Department of Botany, Panjab University, Chandigarh – 160 014 (u.t.) jointly with School of Biotechnology, Shri mata Vaishno Devi (SMVD) University, Kakryal, Katra- 182 320 (J&K)- 13-15, February 2015.
25. Gowhar A. Shapoo, Zahoor A. Kaloo, Aijaz H. Ganie, Bilal A. Tali, **Seema Singh**, Samar Amin, Shazia Rashid, Burhan M. Padder. Efficient agro-techniques for ex-situ conservation of some prized medicinal orchid species growing in Kashmir Himalaya. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
26. Samar Amin, Zahoor A. Kaloo and **Seema Singh**. Micropropagation *Inula royleana* DC. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
27. Mudasar Ahmad, Zahoor A. Kaloo, Ashaquallah Bhat, Bashir A. Ganai, **Seema Singh**, Burhan M. Padder, Hilal A. Ganai, Mudasir Tantray. Natural bioactives in cancer treatment and prevention. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
28. Iram Bashir, Zahoor A. Kaloo, **Seema Singh** and Sabreena Rashid. *In vitro* propagation protocol of *Bunium perscium*(Boiss.) B.Fedtsch. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.

29. Arisa Nabi, Zahoor A. Kaloo, **Seema Singh**. Callus production from leaf mid rib explants of *Taxus wallichiana* Zucc. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
30. Mahroofa Jan, **Seema Singh**, Zahoor A. Kaloo and Farhana Maqbool. Multiple shoot regeneration from different explants of *Ajuga bracteosa* Wall ex Benth-an important medicinal plant. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
31. Ruqaya Rasool, Zahoor A. Kaloo and **Seema Singh**. Response of different explants of *Delphinium cashmerianum* Royle under *in vitro* conditions. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
32. Farhana Maqbool, **Seema Singh**, Zahoor A. Kaloo and Mahroofa Jan. Shoot regeneration from different explants of *Atropa acuminata* Royle-a threatened medicinal plant species of Kashmir Himalaya. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
33. Sabreena Rashid, Zahoor A. Kaloo, **Seema Singh** and Iram Bashir. Embryo culture: A technique for the rapid propagation of *Rheum webbianum* Royle. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
34. Jasfeeda Qadir, **Seema Singh** and Zahoor A. Kaloo. Seed germination in *Polygonatum verticillatum* (L.) All. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
35. Sumeet Kour, **Seema Singh** and Zahoor A. Kaloo. Callus production from pedicel explants of *Saussurea costus* (Falc.) Lipsch. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
36. Mehpara Maqsood, Mir Khusurau, Zahoor A. Kaloo, Mujib A and **Seema Singh**. Development of *in vitro* cultures from explants of colchicine producing herb- *Colchicum luteum* Baker. 10<sup>th</sup> JK Science Congress, organized by University of Jammu and J&K State Council for science and Technology. 14-16, March 2015.
37. Gowhar A. Shapoo, Zahoor A. Kaloo, Aijaz H. Ganie, **Seema Singh**, Bilal A. Tali, Samar Amin & Shazia Rashid. Efficient ex- situ conservation strategies for *Dactylorhiza hatagirea* (D. Don) Soo, an important orchid species growing in Kashmir Himalaya. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
38. Samar Amin, Zahoor A. Kaloo and **Seema Singh**. *In vitro* propagation strategies for ex- situ conservation of *Inula royleana* DC. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.

39. Iram Bashir, Zahoor A. Kaloo, **Seema Singh** and Sabreena Rashid. Regeneration from the hypocotyls explant of *Bunium persicum*- A step towards the conservation of this plant. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
40. Sabreena Rashid, Zahoor A. Kaloo, **Seema Singh** and Iram Bashir. Embryo culture: A technique for the rapid propagation of *Rheum webbianum* Royle. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
41. **Seema Singh**, Gowhar A Shapoo, Bilal A. Tali, Zafar A. Reshi, Zahoor A. Kaloo and Aijaz H. Ganie. Effect of different nutrient media on shoot regeneration from pseudobulbs of *Malaxis mucifera* (Lindl.) Kuntze, an important medicinal orchid species growing in Kashmir Himalaya. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
42. Shazia Rashid, Zahoor A. Kaloo, **Seema Singh** and Gowhar A. Shapoo. Efficient *in vitro* regeneration of *Aralia cashemirica* Decne from different explants. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
43. Ruqaya Rasool, Zahoor A. Kaloo and **Seema Singh**. Response of different explants of *Delphinium cashmerianum* Royle under *in vitro* conditions. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
44. Arisa Nabi, Zahoor A. Kaloo, **Seema Singh**. Callus production from leaf mid rib explants of *Taxus wallichiana* Zucc. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
45. Jasfeeda Qadir, **Seema Singh** and Zahoor A. Kaloo and Mehpara Maqsood. *In vitro* seed germination of *Polygonatum verticillatum* (L.) All, an important medicinal plant species growing in Kashmir Himalaya. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.

46. Sumeet Kour, **Seema Singh** and Zahoor A Kaloo. Standardization of rapid protocols for callus differentiation from different explants of *Sassurea costus* (Falc.) Lipsch, an important medicinal plant growing in Kashmir Himalaya. National Symposium on Biodiversity, Biology & Bioprospecting organized by Department of Botany University of Kashmir, Hazratbal Srinagar in Collaboration with SERB, Department of Science and Technology, New Delhi. 1-2 April, 2015.
47. Burhan M. Padder , Zahoor A. Kaloo, **Seema Singh**, Gowhar A. Shapoo and Mudasar Ganaie . *Ex- situ* conservation strategies for temperate terrestrial medicinal orchids of Kashmir Himalaya. **11<sup>th</sup>** JK Science Congress. Scientific, Social & Economic Dimensions of Climate Change. Organised by University of Kashmir and J&K State Science, Technology & Inovation Council and Department of Science & Technology, Govt of India. 12-14 October, 2015.
48. **Seema Singh**, Gowhar A. Shapoo, Zafar A. Reshi, Aijaz Hassan Ganie, Bilal A. Tali and Zahoor A. Kaloo. *Ex-situ* conservation of *Malaxis mucifera* (Lindl.)Kuntze and *Listera ovata* (Linn.) R.Barown-Two orchid species growing in Kashmir Himalaya. **11<sup>th</sup>** JK Science Congress. Scientific, Social & Economic Dimensions of Climate Change. Organised by University of Kashmir and J&K State Science, Technology & Inovation Council and Department of Science & Technology, Govt of India. 12-14 October, 2015.
49. Samar Amin, Zahoor A Kaloo and **Seema Singh**. Effect of cytokinins on multiple shoot regeneration from leaf derived callus of *Inula royleana* DC. **11<sup>th</sup>** JK Science Congress. Scientific, Social & Economic Dimensions of Climate Change. Organised by University of Kashmir and J&K State Science, Technology & Inovation Council and Department of Science & Technology, Govt of India. 12-14 october, 2015.
50. Mahroofa Jan, **Seema Singh**, Zahoor A Kaloo and Farhana Maqbool. *In vitro* callus induction and shoot regeneration from petiole explants of *Ajuga bracteosa* Wall ex.Benth. **11<sup>th</sup>** JK Science Congress. Scientific, Social & Economic Dimensions of Climate Change. Organised by University of Kashmir and J&K State Science, Technology & Inovation Council and Department of Science & Technology, Govt of India. 12-14 october, 2015.
51. Gowhar A. Shapoo, Zahoor A. Kaloo, **Seema Singh** and Aijaz Hassan Ganie. A Survey on traditional medicinal uses of *Dactylorhiza hatagirea* D.Don (Soo): an important medicinal orchid species growing in Kashmir Himalaya. Global Unani Conference on Unani Medicine: “Emerging Trends and Future Prospectus” Organised by Directorate General of Indian Systems of Medicine ,Jammu & Kashmir, India 12-13 October, 2015.
52. Zahoor A Kaloo, Gowhar A Shapoo, Aijaz Hassan Ganie, **Seema Singh** and Burhan M Padder. Present status of Orchid research in Kashmir Himalaya-India. National Conference cum Workshop on “Advances in Orchid Biology with Focus on Climate Change, Medicinal and Floricultural Plants and Sustainable Economic Utilization” jointly with and at Dr. Y.S.R Horticultural University, Venkataramannagudem, West Godavari District, Andhra Pradesh. 26-28 February, 2016

53. Farhana Maqbool, **Seema Singh**, Bashir A Ganai and Mahroofa Jan *In vitro* propagation of *Atropa acuminata* Royle by using stem cuttings. 12<sup>th</sup> JK Science Congress. J and K State Science, Technology and Innovation Council, 2-4 March, 2017.
54. Mahroofa Jan, **Seema Singh**, Irshad Ahmad Nawchoo and Farhana Maqbool Callus induction and multiple shoot regeneration from hypocotyl explant of *Heracleum candicans* Wall.- an important medicinal plant. 12<sup>th</sup> JK Science Congress. J and K State Science, Technology and Innovation Council, 2-4 March, 2017.
55. Jasfeeda Qadir, **Seema Singh**, Zahoor A Kaloo, Samar Amin and Sumeet Kour. *In vitro* propagation of *Polygonatum verticillatum* (L.) All. – a threatened medicinal herb. 12<sup>th</sup> JK Science Congress. J and K State Science, Technology and Innovation Council, 2-4 March, 2017.
56. Sumeet Kour **Seema Singh**, Zahoor A Kaloo and Jasfeeda Qadir. *In vitro* propagation of *Saussurea costus* (Falc.) Lipsch. an endangered medicinal plant of North Western Himalaya. 12<sup>th</sup> JK Science Congress. J and K State Science, Technology and Innovation Council, 2-4 March, 2017.
57. Mahroofa Jan, **Seema Singh**, Irshad Ahmad Nawchoo and Farhana Maqbool. Callus induction and multiple shoot regeneration from cotyledon explants of *Heracleum candicans* Wall. - an important medicinal herb. National conference on biotechnology and environment (NCOBE-2017). Department of Biotechnology, Jamia Millia Islamia (A Central University), New Delhi & National Environmental Science Academy (NESA), New Delhi
58. Samar Amin\*, Zahoor A Kaloo, **Seema Singh**. Effect of cytokinin/auxin combination on rapid shoot regeneration in *Inula royleana* DC. National conference on biotechnology and environment (NCOBE-2017). Department of Biotechnology, Jamia Millia Islamia (A Central University), New Delhi & National Environmental Science Academy (NESA), New Delhi
59. Samar Amin, Zahoor Ahmad Kaloo, **Seema Singh**, Tareq Ahmad Wani, Riffat John, Umer Majeed, Gowhar Ahmad Shapoo. RAPD analysis for assessment of genetic stability in *Inula royleana* DC., an important medicinal plant growing in Kashmir Himalaya. One Day National Seminar on “Biodiversity and Climate Change: Challenges and Prospects” Organised by Department of Environmental Science, Govt SAM Degree College Budgam, 2017.
60. Farhana Maqbool, **Seema Singh**, Bashir A. Ganai and Mahroofa Jan. Shoot regeneration from *in vitro* petiole explant of *Atropa acuminata* Royle. One Day National Seminar on “Biodiversity and Climate Change: Challenges and Prospects” Organised by Department of Environmental Science, Govt SAM Degree College Budgam, 2017
61. Jasfeeda Qadir\*, **Seema Singh**, Zahoor A Kaloo, Conservation of *Polygonatum verticillatum* (L.) All. through tissue culture techniques. National conference on biotechnology and environment (NCOBE-2017). Department of Biotechnology, Jamia Millia Islamia (A Central University), New Delhi & National Environmental Science Academy (NESA), New Delhi

62. Farhana Maqbool, **Seema Singh**, Bashir A. Ganai and Mahroofa Jan. Shoot regeneration from *in vitro* petiole explant of *Atropa acuminata* Royle. One Day National Seminar on “Biodiversity and Climate Change: Challenges and Prospects” Organised by Department of Environmental Science, Govt SAM Degree College Budgam, 2017
63. Jasfeeda Qadir, **Seema Singh**, Zahoor A. Kaloo, Bashir A. Ganai and Sumeet Kour. Germplasm conservation through synthetic seed production of *Polygonatum verticillatum* (L.) All.-a threatened medicinal herb of Kashmir Himalaya. One Day National Seminar on “Biodiversity and Climate Change: Challenges and Prospects” Organised by Department of Environmental Science, Govt SAM Degree College Budgam, 2017.
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- 2) **Singh, Seema**; Virk, G S; Kaloo, Zahoor A and Padder, M Burhan Shapoo, Gowhar A. (2011). Plant regeneration from calyx derived callus in *Petunia hybrida*. *Journal of Ornamental Horticulture*, 14(3&4):23-26. ISSN 2249- 880x

- 3) Padder, B.A., Agarwal, R.M. and Kaloo, Zahoor A. and **Singh Seema** (2012). Nitrate Reductase Activity Decrease due to Salinity in Mungbean (*Vigna radiata*) **L.Wikzek** Var Hum\_1. *International Journal of Current Research and Review.*, Vol. 4(4): 117-124. ISSN 2231- 2196
- 4) Shapoo, Gowhar A. Kaloo, Zahoor A. **Singh Seema**, Ganie Aijaz H. Padder, Burhan M. Samar A and Tabinda, A (2013). *Oreorchis micrantha* **Lindley**: A New Record to Kashmir Valley. *International Journal of Modern Botany.* 3 (01)-10-14. ISSN: 2166-5206
- 5) Amin, Samar., Kaloo, Zahoor A. **Singh Seema** and Tabinda, A. (2013). Medicinal importance of genus *Inula* - A Review. *International Journal of current Research and Review.* 5(2)-20-26 ISSN 2231- 2196.
- 6) Shapoo, Gowhar A. Kaloo. Zahoor A., Ganie, Aijaz H. and **Singh Seema** (2013). Ethnobotanical survey and documentation of some orchid species of Kashmir Himalaya, J&K-India. *International Journal of Pharmaceutical and Biological Research* 4(2)32-40 ISSN: 0976- 285X.
- 7) Padder, B.M., Kaloo, Zahoor A., **Singh Seema**, Shapoo, Gowhar A. 2013. Role of tissue culture in mass multiplication and conservation of temperate Himalyan orchids. *International Journal of Recent Scientific Research.* 4(7):979-983. ISSN 0976-3032.
- 8) Amin, Samar., Kaloo, Zahoor A., **Singh Seema**, Altaf, Tabinda. 2013. Micropropagation of medicinally important plant species of family Asteraceae – a review. *International Journal of Recent Scientific Research* 4:1296- 1303. ISSN 0976-3032.
- 9) Amin, Samar, Kaloo, Zahoor A., **Singh Seema**. 2013. Comparative efficiency of different explants for *in vitro* callus production in *Inula royleana* DC. a threatened medicinal plant growing in Kashmir Himalaya. *International Journal of Advanced Research* 1:617-623. ISSN 2320-5407.
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- 11) Mahroofa Jan, **Seema Singh**, Kaloo, Zahoor A, Farhana Maqbool. 2014. Medicinal importance of *Ajuga bracteosa* Wall ex Benth.-A review. *International Journal of Advanced Research* (2) 1, 389-394 ISSN: 2320-5407. ISSN 2320-5407.
- 12) Farhana Maqbool, **Seema Singh**, Kaloo, Zahoor A, Mahroofa Jan. 2014. Medicinal importance of Genus *Atropa* Royle-A Review. *International Journal of Advanced Research* (2) 2, 48-54. ISSN: 2320-5407. ISSN 2320-5407
- 13) Burhan M. Padder, Kaloo, Zahoor A., **Seema Singh**, Gowhar A. Shapoo Mudasar Ganaie 2014. *In vitro* asymbiotic seed germination leading to protocorm formation in *Cephalanthera longifolia* (L.) Fritsch an endangered orchid of Kashmir Himalaya. *Journal of Biotechnology* 3(1) 26-30. ISSN 2319-2359.

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- 17) Sabreena Rashid, Kaloo Zahoor A, **Singh Seema** & Iram Bashir.(2014). Medicinal importance of Genus *Rheum* -A review. *International Journal of Advanced Research* 2 (7), 261-267.
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- 19) Mahroofa Jan, **Singh Seema**, Kaloo Zahoor A and Farhana Maqbool. (2014). Callus induction and multiple shoot regeneration in *Ajuga bracteosa* Wall ex. Benth.-An important medicinal plant growing in Kashmir Himalaya. *Journal of Scientific and Innovative Research* 3(3): 319-324.
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- 21) Sabreena Rashid, Kaloo Zahoor A, **Singh Seema** & Iram Bashir. (2014). Callus induction and shoot regeneration from rhizome explants of *Rheum webbianum* Royle-a threatened medicinal plant growing in Kashmir Himalaya. *Journal of Scientific and Innovative Research*.3(5):515-518
- 22) Amin, Samar, Kaloo Zahoor A., **Singh Seema**. (2015). *In vitro* propagation strategies for *ex-situ* conservation of *Inula royleana* DC., a threatened medicinal plant of Kashmir Himalaya. *Discovery Biotechnology* 6(16), 16-29
- 23) Burhan M. Padder, Kaloo, Zahoor A., **Seema Singh**, Meenaza Manzoor Mudasar Ganaie and Gowhar A. Shapoo (2015). Auxin induced germination and plantlet regeneration via rhizome section culture in *Spiranthes sinensis* (Pers.)Ames: A Vulnerable medicinal orchid of Kashmir Himalaya. *Journal and Biotechnology and Biochemistry*1(2):17-20
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- 25) Sumeet Kour, **Seema Singh** and Kaloo, Zahoor A(2015). Conservation strategies of *Sassurea Costus*, Critically endangered medicinal herb growing in Kashmir Himalaya-A Review. *International Journal of Science and Research*. 4(7):257-280

- 26) Mudasar Ahmad, Kaloo Zahoor A, Bashir A Ganai, Hilal A Ganaie and **Seema Singh** (2016). Phytochemical screening of *Meconopsis aculeata* Royle, an important medicinal plant of Kashmir Himalaya: A Perspective Research Journal of Photochemistry 10(1):1-9
- 27) Mahroofa Jan, **Singh Seema** and Farhana Maqbool. (2016) Micropropagation of some medicinally important plant species of family lamiaceae-a review *International journal of bioscience and technology* 9(11):64-73.
- 28) Sumeetkour, **Seema Singh**, zahoor A Kaloo, Gowhar A shapoo and Aijaz Hassan Ganaie (2016) Effective exsitu conservation strategies of Saussure Costus (Falc.) Lipsch An endangered medicinal plant of Kashmir Himalaya. *Saussurea* 6(5):342-349.
- 29) Shapoo, Gowhar A. Kaloo, Zahoor A. Ganie, Aijaz H, Khuroo A Anzar, **Singh Seema** (2016) *Dactylorhiza umbrosa* (Kar. & Kir) Nevski. (Orchidaceae): an addition to flora of india from Kashmir Himalaya. *Checklist* 12(3) 1-4
- 30) Kumar Abhinav, Sinha Vartika, Khan A Zainul, Sarin B Neera, **Singh Seema** and Tiwari Archana (2016). A new monopartite Begomovirus associated with betasatellite molecule causing leaf curl disease of chilli in India. *International Journal of Advanced Research* 4(4), 636 - 641.
- 31) Farhana Maqbool, **Singh Seema**, Kaloo Zahoor A and Mahroofa Jan (2016). A rapid micropropagation protocol of *Atropa acuminata* Royle- a threatened medicinal plant species of Kashmir Himalaya. *Indian journal of biotechnology*. **15** (1): 576-580.
- 32) Kumar Abhinav, Taruna Gupta, **Seema Singh** and Neera B. Sarin (2017) Complete nucleotide sequence of a monopartite tomato leaf curl new dehli virus and betasatellite DNA associated with leaf curl disease of tomato in india. *International Journal of Advanced Research* 5(1) 1683-1686.
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- 35) Mahroofa Jan, **Seema Singh**, Farhana Maqbool (2018) Micropropagation of *Ajuga bracteosa* Wall ex. Benth.-an important medicinal plant growing in Kashmir Himalaya. *International Journal of Advance Research in Science and Engineering*, 7:2010-2020.
- 36) Rumeesa Habib, **Seema Singh**, Iram Bashir (2018) Effect of cytokinins on *in vitro* propagation of *Petunia hybrida* Hort. (Vilm). *International Journal of Trend in Scientific Research and Development*, 2:1149-1152.
- 37) Jan, M., **Singh, S.**, Maqbool, F., & Nawchoo, I. A. (2018). Direct shoot regeneration from hypocotyl explants of *Heracleum candicans* Wall: A vulnerable high value medicinal herb of Kashmir Himalaya. *African Journal of Agricultural Research*, **13**: 1419-1424.
- 38) Samar Amin, Zahoor A Kaloo and **Seema Singh** (2018). Comparative Effect of Different Nutrient Media on Regeneration Potential of Petiole Explants of *Inula*

- Royleana* DC., A Multipurpose Plant Species of Kashmir Himalaya. *Asian Journal of Plant Science and Research*, **8**:15-18.
- 39) Gowhar A Shapoo, Zahoor A Kaloo, Aijaz Hassan Ganie and **Seema Singh**. Development of Agro techniques for Ex Situ Conservation of *Dactylorhiza* Neck. Ex Nevski (orchidaceae) Species Growing in Kashmir Himalaya, India.
  - 40) Mahroofa Jan, **Seema Singh**, Farhana Maqbool and Irshad A. Nawchoo (2018). Direct shoot regeneration from hypocotyl explants of *Heracleum candicans* Wall: A vulnerable high value medicinal herb of Kashmir Himalaya. *African Journal of Agricultural Research*, 13(28):1419-1424.
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  - 42) Mahroofa Jan, **Seema Singh**, Farhana Maqbool and Irshad A. Nawchoo (2019). Effect of explants source and different hormonal combinations on In vitro regeneration of *Heracleum Candicans* Wall. An important medicinal herb. *African Journal of Biotechnology*, 18(28): 707-712.
  - 43) Jasfeeda Qadir, **Seema Singh**, Sumeet Kour, Zahoor A. Kaloo and Bashir A. Ganai (2020). In vitro propagation of *Polygonatum verticillatum* Wall. A threatened medicinal herb through seed explants. *Research Journal of Agricultural Sciences*, 64(2): 111-117.
  - 44) Neelofer Nabi, **Seema Singh**, Peer saffeullah (2020). Callus induction and axillary shoot formation in *Asparagus racemosus* Willd. *Current Botany* 1: 148-151.
  - 45) Nabi, N., **Singh, S.**, & Saffeullah, P. (2021). Responses of *in vitro* cell cultures to elicitation: Regulatory role of jasmonic acid and methyl jasmonate: A review. *In Vitro Cellular & Developmental Biology-Plant*, 57, 341-355.
  - 46) Abdul Hadi, **Seema Singh**, Sajjad Mehdi, (2022). Traditional uses of medicinal plants by indigenous tribes of Ladakh Union Territory. *Research Journal of Agriculture Science*, 13: 068-077.
  - 47) Abdul Hadi, **Seema Singh**, Irshad A Nawchoo, Shah Rafiq, Sajjad Ali (2022). Impacts of habitat variability on the phenotypic traits of *Aconitum violaceum* Jacq. ex Stapf at different altitudes and environmental conditions in the Ladakh Himalaya, India. *Plant Sci. Today*, 9(3): 546-554.
  - 48) Neelofer Nabi, Peer Saffeullah, **Seema Singh** (2022). Micropropagation using direct and indirect organogenesis in *Artemisia maritima* L: scanning electron microscopy of somatic embryos and genome size analysis by flow cytometry. *In vitro cellular and Developmental Biology-Plant*, 58(6), 1012-1024.
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  - 50) Abdul Hadi, **Seema Singh**, Shah Rafiq, Irshad Nawchoo, Nasir Aziz Wagay (2022). In vitro Propagation Of *Aconitum violaceum* Jacq. ex Stapf through Seed Culture and Somatic Embryogenesis. *Horticulturae*, 8(7): 599.

- 51) Kour, S., Singh, S., Wani, T. A., & Kaloo, Z. A. (2023). Chemical characterization and the intrusion through elicitation and *Agrobacterium rhizogenes* mediated hairy root transformation in *Saussurea costus* CB Clarke. *Physiology and Molecular Biology of Plants*, 1-5.
- 52) Hadi, A., Rafiq, S., Singh, S., Ali, S., Nawchoo, I. A., & Wagay, N. A. (2023). Seed viability, seed germination, and micropropagation of *Aconitum violaceum* Jacq. ex Stapf—a rare and threatened medicinal plant of Ladakh Himalaya. *In Vitro Cellular & Developmental Biology-Plant*, 59(3), 315-328.
- 53) Nabi, N., Singh, S., & Saffeullah, P. (2023). An updated review on distribution, biosynthesis and pharmacological effects of artemisinin: A wonder drug. *Phytochemistry*, 113798.

### **Book Chapters**

- 1) Neelofer Nabi, Peer Saffeullah, **Seema Singh**, Shahid Umar. Genetic and Molecular Basis of Jasmonate Metabolism and Interactions with other Phytohormones CRC Press

### **Whether chaired any Scientific Inter-national Conference / Symposium and / or delivered invited lectures in India / abroad (give details)**

1. Chaired a Technical Session during the National Conference on Plant Biology (NCPB 2013) Sept 24-27<sup>th</sup> 2013, Department of Botany, Bangalore University.
2. Chaired a session during Science Academies workshop at Dept. Of Botany, Kashmir University from May 8-10<sup>th</sup> 2014.
3. Chaired a Technical Session on Plant Sciences on 17 Sept 2012, in Botany Department University of Kashmir during 8<sup>th</sup> JK Science Congress.
4. Invited Lecture delivered at the National Conference on Orchids in India: Diversity, Characterization and Resource Development for Community Livelihood at NASI (India) Dec 21- 23<sup>rd</sup> 2011.

### **TEACHING EXPERIENCE**

1. Presently working as Associate Professor in Department of Botany University of Kashmir, Hazratbal, Srinagar.

### **COURSES PRESENTLY TEACHING**

1. Plant cell, tissue and organ culture.
2. Molecular genetics.
3. Biostatistics and Biotechniques.
4. Cell and molecular biology.
5. Biocosmetics.

### **OTHER AWARDS/ACCOMPLISHMENTS**

1. Third prize in the University level science seminar on the revolution in Biotechnology held at Visveshwaraia Industrial and Technological Museum Bangalore 1995
2. First prize in science essay contest held at Mount Carmel college Bangalore 1996
3. First position in the magazine competition held at botanical society, Department of Botany, Bangalore University 1997
4. Second prize in the Ikebana competition held at Sams Krathika Utsav Bangalore University
5. Participated in Flora 1997 show at Bangalore and helped in organizing ikebana shows, dry flowers stalls, seminars 1997.
6. Received 2<sup>nd</sup> prize in Poster Presentation On international day for Biological Diversity Organized by Department of Botany, University of Kashmir, Srinagar.
7. Received *Certificate of Excellence in Research* from **ETT-Faculty Branding Awards-2015-Kolkata- India**
8. Received *Young Faculty award* from **ETT-Faculty Branding Awards - Feb 2016 at Noida- India**
9. Received '**Indira Gandhi Priyadarshini award**' for outstanding achievement International business council, New Delhi 2016
10. Received *Best Citizen Award for Academic Excellence* from **The Economic For Health And Educational Growth** on November,2016 at Panjim, Goa.
11. Received *Best Faculty award* from **EET CRS Academic Branding Awards - 2017 at Mumbai- India**
12. Received *Best Researcher award* from **EET CRS Academic Branding Awards - 2017 at Mumbai- India**
13. Received women scientist award of excellence in **ICEACBS 2021**.
14. Received women who lead national award 2021 by **Summentro Pro 2021**