

Name: Dr. Santosh Bala

Designation: Assistant Professor

Specialization: Plant Cytogenetics & Systematics

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Education

M.Sc. Botany (With Dissertation) (2007, Punjabi University, Patiala)

M.Sc. dissertation title: Cytomorphological studies in some members of Compositae from North India

Ph.D. (11 December, 2012, Punjabi University, Patiala)

Ph.D. Thesis title: Exploration of Cytomorphological Diversity in Gamopetalae from district Kangra (H.P.)

Professional Experience

Department of Botany, Multani Mal Modi College, Patiala, Punjab (19-01-2016 to till date)

Department of Botany, Punjabi University Guru Kashi College, Damdama Sahib, Punjab (11-09-2013 to 18-01-2016)

Teaching interests:

- Cell Biology
- Systematics of Angiosperms and Gymnosperms
- Reproduction and development of flowering plants
- Diversity of Microbes & Cryptogams
- Plant Ecology

Research interest:

Plant Cytogenetics, Systematics, Cytological studies

Research Publications

- 1) **Santosh Bala**, Beena Kaushal, Henna Goyal and Raghbir C. Gupta "A case of synaptic mutant in *Erigeron karvinskianus* DC. (Latin American fleabane)". *Cytologia*. (2010) **75 (3)**: 299-304.

https://www.jstage.jst.go.jp/article/cytologia/75/3/75_3_299/_article

- 2) Raghbir C. Gupta, **Santosh Bala**, Henna Goyal, Reyaz A. Malik and Santosh Kumari "Cytological studies in some members of tribe Senecioneae (Asteraceae) from North and Central India". *Cytologia*. (2010) **75 (4)**: 369-378.

https://www.jstage.jst.go.jp/article/cytologia/75/4/75_4_369/_article

- 3) **Santosh Bala** and Raghbir C. Gupta "Chromosomal diversity in some species of *Plantago* (Plantaginaceae) from North India". *International Journal of Botany* (2011) **7 (1)**: 82-89.
<https://scialert.net/abstract/?doi=ijb.2011.82.89>
- 4) **Santosh Bala**, Raghbir C. Gupta and Preet B. Aitri "Cytological studies on the Monochlamydeae from North India". *Chromosome Botany* (2011) **6**: 45-51.
https://www.jstage.jst.go.jp/article/iscb/6/2/6_2_45/_article
- 5) **Santosh Bala** and Raghbir C. Gupta "Effect of secondary associations on meiosis, pollen fertility and pollen size in cape gooseberry (*Physalis peruviana* L.)". *Chromosome Botany* (2011) **6**: 25-28. https://www.jstage.jst.go.jp/article/iscb/6/2/6_2_25/_article
- 6) **Santosh Bala**, Henna Goyal and Raghbir C. Gupta "Intraspecific polyploidy in *Galinsoga parviflora* Ruiz & Pavon.". *Journal of Research and Development*. (2011) **10**: 37-41.
<http://cord.uok.edu.in/Main/JournalVolume.aspx?V=Volume10>
- 7) **Santosh Bala** and Raghbir C. Gupta "In Marhold, K. (Ed.). IAPT/IOPB Chromosome data 12". *Taxon* (2011) **60 (6)**: 1784-1786.
http://ibot.sav.sk/usr/Karol/docs/PDF_files/IAPT_IOPB%20Chromosome%20data%2012.pdf
- 8) **Santosh Bala** and Raghbir C. Gupta "Cytological Investigations on Some North Indian Bicarpellatae". *Cytologia* (2011) **76 (3)**: 261-267.
https://www.jstage.jst.go.jp/article/cytologia/76/3/76_3_261/_article
- 9) **Santosh Bala**, Beena Kaushal and Raghbir C. Gupta. "Effect of B-chromosomes on meiotic behaviour and genetic recombination in *Artemisia nilagirica* (C.B. Clarke) Pamp.". *Chromosome Botany* (2012) **7**: 9-12.
https://www.jstage.jst.go.jp/article/iscb/7/1/7_1_9/_article
- 10) **Santosh Bala** and Raghbir C. Gupta "Cytomorphological Studies on Some North Indian Members of the Family Verbenaceae". *Cytologia* (2012) **77 (2)**: 187-195.
https://www.jstage.jst.go.jp/article/cytologia/77/2/77_187/_article
- 11) **Santosh Bala** and Raghbir C. Gupta "In Marhold, K. (Ed.). IAPT/IOPB Chromosome data 14". *Taxon* (2012) **61 (6)**: 1337.
http://ibot.sav.sk/usr/Karol/docs/PDF_files/IAPT_IOPB_Chrom_data14.pdf
- 12) **Santosh Bala** and Raghbir C. Gupta "Male meiosis and Chromosome number in Asteraceae family from district Kangra of H.P. (Western Himalayas)". *International Journal of Botany and Research* (2013) **3 (1)**: 43-58.
<http://www.tjprc.org/publishpapers/--1362482479-5.Male%20meiosis.full.pdf>
- 13) Raghbir C. Gupta, **Santosh Bala**, Shilpa Sharma and Manish Kapoor "Cytomorphological studies in some species of *Chrysanthemum* L. (Asteraceae)". *Chromosome Botany* (2013) **8**: 71-76.
https://www.jstage.jst.go.jp/article/iscb/8/3/8_69/_article

- 14) Vivek Sharma, Raghbir C. Gupta, **Santosh Bala** and Bikram Singh “New chromosome number reports in some medicinally important Angiosperms of North India”. *Cytologia*. (2013) **78 (3)**: 285-296.
https://www.jstage.jst.go.jp/article/cytologia/78/3/78_285/_article
- 15) Raghbir C. Gupta, **Santosh Bala** and Suruchi “Cytogenetical Studies in Seven Ornamental Species of *Chrysanthemum* (Asteraceae)”. *Cytologia*. (2013) **78 (4)**: 439-448.
https://www.jstage.jst.go.jp/article/cytologia/78/4/78_439/_pdf
- 16) **Santosh Bala** and Raghbir C. Gupta “Aberrant meiotic behaviour in some members of family Solanaceae from North India”. *International Journal of Botany and Research* (2014) **4 (3)**: 11-22.
https://www.academia.edu/7700319/ABERRANT_MEIOTIC_BEHAVIOUR_IN_SOME_MEMBERS_OF_FAMILY_SOLANACEAE_FROM_NORTH_INDIA
- 17) **Santosh Bala** and Raghbir C. Gupta “Meiotic behaviour in two triploids: *Erigeron annuus* and *Eupatorium adenophorum* (Asteraceae)”. *Biolife Journal* (2014) **2 (2)**: 679-686.
https://www.academia.edu/8024508/679_Biolife_2014_Vol_2_Issue_2_MEIOTIC_BEHAVIOUR_IN_TWO_TRIPLOIDS_ERIGERON_ANNUUS_AND_EUPATORIUM_ADENOPHORUM_ASTERACEAE
- 18) **Santosh Bala**, Reyaz A. Malik, and Raghbir C. Gupta “New chromosome counts in some Gentians from Western Himalayas”. *Caryologia*. (2015) **68 (2)**: 147-153.
<https://www.tandfonline.com/doi/full/10.1080/00087114.2015.1032603>
- 19) **Santosh Bala**, Reyaz A. Malik, and Raghbir C. Gupta “Male meiosis in structural heterozygotes”. *Biolife Journal* (2016) **4(3)**: 587-594.
https://www.researchgate.net/publication/310054310_Male_meiosis_in_structural_heterozygotes
- 20) Reyaz A. Malik, Raghbir C. Gupta, Vijay Singh, **Santosh Bala** and Santosh Kumari “New Chromosome reports in Lamiaceae of Kashmir (Northwest Himalaya), India”. *Protoplasma* (2017) **254 (2)**: 971-985.
<https://link.springer.com/article/10.1007%2Fs00709-016-1006-7>
- 21) Raghbir C. Gupta, Vijay Kataria, **Santosh Bala**, Reyaz A. Malik, Vikas Sharma and Kuljit Kaur “Cytomorphological variations and new reports of B-chromosomes in the genus *Plantago* (Plantaginaceae) from Northwest Himalaya”. *Flora-Morphology Distribution Functional Ecology of plants* (2017) **234**: 69-76.
<https://www.sciencedirect.com/science/article/pii/S0367253017332486?via%3Dihub>

Book chapter

1. **Santosh Bala** 2022. Bioresources and its conservation: *In Environmental issues: Causes and Resolutions 978-93-954567-9-1*, Eds. M. Dhiman, S. Kaur, B. R. Kaur, Red'shine publishers, Gujarat.

Conference/ Seminar/ Symposium

a) List of papers presented

- 1) **Santosh Bala** and Raghbir C. Gupta (2010) "*Effect of Secondary associations on meiosis, pollen viability and pollen size in cape gooseberry (Physalis peruviana L.)*". In "National Symposium on Botanical Researches: Present Scenario" at Department of Botany, Punjabi University, Patiala-147002, India, 18-19 February (2010).
- 2) **Santosh Bala** and Raghbir C. Gupta (2012). "*An Inventory on chromosome number data on wild taxa of Gamopetalae from district Kangra (H.P.)*". In "National Symposium on Plant Cytogenetics: New Approaches" at Department of Botany, Punjabi University, Patiala-147002, India, 23-24 February (2012).
- 3) **Santosh Bala** and Raghbir C. Gupta (2012). "*Effect of B-chromosomes on meiotic behaviour and genetic recombination in Artemisia nilagirica (C.B. Clarke) Pamp.*". In "National Conference on Plant & Microbial Biodiversity, Present Scenario, Threats & Conservation Strategies" at Department of Botany, Panjab University, Chandigarh-160014, India, 1-2 March (2012).
- 4) **Santosh Bala** and Raghbir C. Gupta (2014). "*Meiotic studies on Bicarpellatae from district Kangra (H.P.)*". In "National symposium on Emerging Trends in Botanical Sciences" at Department of Botany, Punjabi University, Patiala-147002, India, 17-18 February (2014).
- 5) **Santosh Bala** and Raghbir C. Gupta (2014). "*New Chromosome Additions to some Gamopetalous members from District Kangra (H.P.)*". In "Perspectives & Trends in Plant Sciences and Biotechnology" at Department of Botany, Panjab University, Chandigarh-160014, India, 21-23 February (2014).
- 6) **Santosh Bala** and Raghbir C. Gupta (2014). "*Cytomorphological diversity in Some North Indian Members of the Family Verbenaceae.*" In "Perspectives in Plant and Environmental Sciences" at Department of Botanical & Environmental Sciences, Guru Nanak Dev University, Amritsar-143005, India, 11-12 March (2014).
- 7) **Santosh Bala** and Raghbir C. Gupta (2016). "*A case of Synaptic Mutant in Erigeron karvinskianus DC. (American Fleabane)*". In "8th National conference on Recent Advances in Chemical, Biological and Environmental Sciences (RACES-2016)" at Multani Mal Modi College Patiala-147001, India, 19-20 February (2016).
- 8) **Santosh Bala** and Raghbir C. Gupta (2016). "*Chromosomal database of Gamopetalae of district Kangra (H.P.)*". In "National conference on Basic and Applied Researches in Plants and

Microbes in Botanical Sciences" at Department of Botany, Punjabi University, Patiala-147002, India, 3-5 November (2016).

- 9) **Santosh Bala** and Raghbir C. Gupta (2016). "*New Chromosome reports in Gamopetalae of District Kangra (H.P.)*". In "2nd National Symposium on Emerging Trends in Biological Sciences" at Department of Biological Sciences, Multani Mal Modi College Patiala-147001, India, 12 November (2016).
- 10) **Santosh Bala** and Raghbir C. Gupta (2018). "*Male meiosis in structural heterozygotes*". In "9th National conference on Recent Advances in Chemical, Biological and Environmental Sciences (RACES-2018)" at Multani Mal Modi College Patiala-147001, India, 9-10 February (2018).
- 11) **Santosh Bala** and Raghbir C. Gupta (2019). "*Cytogenetical studies in seven ornamental species of Chrysanthemum (Asteraceae)*". In "10th National conference on Recent Advances in Chemical and Environmental Sciences (RACES-2019)" at Multani Mal Modi College Patiala-147001, India, 11-12 April (2019).
- 12) **Santosh Bala** and Raghbir C. Gupta (2020). "*New Chromosome reports in Gamopetalae of District Kangra (H.P.)*". In "3rd National Conference on Innovations in Bioscience & Technology" at Department of Biological Sciences, Multani Mal Modi College Patiala-147001, India, 7 March (2020)
- 13) One Day Webinar on "NEW OPPORTUNITIES IN MEDICINAL PLANTS SECTOR FOR FARMERS AND ENTREPRENEURS" held on May 24, 2020 organized by Department of Life Sciences, Mansarovar Global University.
- 14) One Day International Webinar on "Post COVID Challenges Before Indian Education System" held on May 29, 2020 organized by CTEF & Multani Mal Modi College, Patiala.

b) List of Published abstracts

- 1) **Santosh Bala**, Santosh Kumari and Raghbir C. Gupta (2008). "*Exploration of Cytomorphological diversity in Gamopetalae from Kangra district (H.P.)*". p.67. (A.16) In: Kumari S., Gupta R.C. and Saggoo M.I.S. (eds.) "National Symposium on Plant Cytogenetics: Recent trends" in Department of Botany, Punjabi University, Patiala-147002, India, 15-16 February (2008).
- 2) **Santosh Bala** and Raghbir C. Gupta (2008). "*Cytomorphological diversity in Composites from Kangra district (H.P.)*". p.77. (A.29) In: Kumari S., Gupta R.C. and Saggoo M.I.S. (eds.) "National Symposium on Plant Cytogenetics: Recent trends" in. Department of Botany, Punjabi University, Patiala-147002, India, 15-16 February (2008).
- 3) **Santosh Bala** and Raghbir C. Gupta (2011). "*Cytomorphological Diversity in some Members of Gamopetalae from District Kangra (H.P.)*". p. 121 (154) Lakhnupal T.N. (ed.) Section XIV- Plant Sciences. Proceedings of the Ninety Eighth Session of the Indian Science Congress. Chennai, India, January (2011).
- 4) **Santosh Bala** and Raghbir C. Gupta (2012). "*Aberrant meiotic behaviour in some members of family Solanaceae from Kangra district (North India)*". p.52. (A.3) In: Atri N.S., Saggoo M.I.S.,

Singhal V.K. and Gupta R.C. (eds.) "National Symposium on Plant Cytogenetics: New Approaches" in Department of Botany, Punjabi University, Patiala-147002, India, 23-24 February (2012).

- 5) **Santosh Bala** and Raghbir C. Gupta (2013). "Occurrence, Behaviour and Effect of B-Chromosomes on Male Meiosis in Some Dicots". p. 35 (BOT 41) In: Andrabi K.I., Zargar M.A., Nawchoo I.A. & Ahmad F. (eds.) Ninth J&K Science Congress on "Innovations & Advances in Science & Technology" in University of Kashmir, India, 1-3 October (2013).

Participation in Conference/ Seminar/ Symposium

1. **Santosh Bala** (2022). 'Quantitative analysis covering microscopic details of flowering plants from North India" **Oral Presentation** in one day national conference theme' **Through the Instruments'** on 22 December 2022 organized by Department of Chemistry, Shri Shivayogi Murughendra Swamiji Arts, Science and Commerce College, Athani-591304.
2. **Santosh Bala** (2023). **OP-49:** Incidence of Polyploidy In Members of Asteraceae Family ; **Oral Presentation** in International conference on Growth of Biological Sciences in 21st Century by Faculty of Life Sciences, PUP, 2-4 March 2023
3. **Santosh Bala** (2023). Multivalents, reduced fertility and meiotic correlates of Polyploidy . **Oral Presentation** in national conference **4th National Research Scholars Meet** in (Association with Indian Science Congress Association (Patiala Chapter) on Theme Evolving trends and Challenges in Multidisciplinary Research' on 16-17, March 2023.
4. **Santosh Bala** (2023) **AB-46** : Cytomorphological Diversity in *Lindenbergia indica* (Linn.) Vatke. Conference, P.41 In: Bhanvi Wadhawan and Anupama Parmar " 11th National conference on Recent Advances in Chemical, Biological and Environmental Sciences (RACES-2019), Multani Mal Modi College Patiala-147001, India, 12-13 April, 2023.
5. **Santosh Bala (2024)** Plant derived biofuels: A non-conventional Advanced substitute. **Oral Presentation** in National Conference on Emerging trends in Science and Technology for sustainable development organized by DAV College Bathinda on March 02, 2024.
6. **Santosh Bala (2024)** **A-AM-145:** Production of Biofuel from Plant derived Natural biomaterials. **Oral Presentation** in National Conference on Advanced and Emerging materials for Technological applications (AMETA-2024) organized by Department of Physics, Mechanical Engineering, Electronics and Communication Engineering, Sant Longowal Institute of Engineering and Tech. Longowal Punjab on March 02, 2024.
7. **Santosh Bala** (2024). Cytomorphological Investigation in *Bidens* Species from District Kangra (H.P.). **Oral Presentation** in National conference '**5th National Research Scholars Meet-2024'** organised by Sri Guru Granth Sahib World University, Fateharh Sahib, Punjab on March 28-29, 2024.

Training Course/FDP

- 1) Attended UGC sponsored seven day faculty development program on Academic writing from critical appreciation to publication, organized by IQAC, Multani Mal Modi College, Patiala (9-16 January, 2017).
- 2) Attended faculty development program on Emerging Issues & Challenges in Higher Education, organized by IQAC, Multani Mal Modi College, Patiala (17-22 July, 2019).
- 3) One Day Webinar on “WORLD ENVIRONMENT DAY” held on June, 5, 2020 organized by Department of Botany & Environmental Science, Sri Guru Granth Sahib World University, Fatehgarh Sahib.
- 4) 4-week Induction/Orientation Programme for Faculty in Universities/Colleges/ Institutes of Higher Education from 4 June-1 July, 2020 organized by Teaching Learning Centre, Ramanujan College, University of Delhi.
- 5) Seven days FDP on “RESEARCH METHODOLOGY FOR SOCIAL SCIENCES” from June 20-26, 2020 organized by CTEF & Multani Mal Modi College, Patiala.
- 6) One day Conference on “NATIONAL CAPABILITY ENHANCEMENT CONFERENCE: EDUCATION FOR MEANINGFUL LIFE PART-3” on July 2, 2020 organized by Multani Mal Modi College, Patiala.
- 7) 2-week FDP on “ADVANCED CONCEPTS FOR DEVELOPING MOOCS” from 2-17 July, 2020 organized by Teaching Learning Centre, Ramanujan College, University of Delhi.
- 8) Online Lecture on theme “ COVID-19 and the state of state finances” on November 10, 2020 organized by Department of Social Sciences, Multani Mal Modi College, Patiala.
- 9) International Webinar on “Current trends & future prospects of plant sciences” held on December 17, 2020 organized by Department of Botany & Government College, Patharia, India.
- 10) 7- Days Virtual National Level Capacity Building Program on “Integration of Pedagogy & Technology in Teaching-Learning” from July 13-19, 2021 organized by Multani Mal Modi College Patiala.
- 11) Attended 2-week Refresher Course on ‘Research Methodology in Sciences’ organised by HRDC, Panjab University Chandigarh from September 14-27, 2021.
- 12) Attended 7 days Faculty Development Program on Research Methodology organized by Internal Quality Assurance cell of Multani Mal Modi College, Patiala from January 12-19, 2022.
- 13) Attended a 10 days short term course on ‘NEP Orientation and sensitization program’ held on February 05-14, 2024 organized by UGC-Malaviya Mission Teacher Training centre, (HRDC), Punjabi University, Patiala
- 14) Attended 7 Days National level Virtual Faculty Development Program on “Emerging Trends in Plant Sciences’ from March 4-11, 2024 organized Department of Botany, Bishop Heber College (Autonomous), Tiruchirappalli, Tamil Naidu-17.

Conferences/Seminar/webinar/Extension lecture attended

- 1) Attended a webinar entitled 'Sustainable Wastewater and solid waste management- case studies' organised by Muffakham Jah College of Engineering and Technology, Hyderabad, Telangana on June 05, 2021.
- 2) Attended a Symposium on NEP-2020 IQAC in Collaboration with 'The Council for Teacher Education Foundation (CTEF Punjab and Haryana Chapter) organized a symposium NEP-2020 at Multani Mal Modi College Patiala on May 8, 2023.
- 3) Attended a lecture on 'Design Thinking for Innovative Teaching Practices' organized by Internal Quality Assurance Cell at Multani Mal Modi College Patiala on August 12, 2023.
- 4) Attended a seminar on Cyber Security Awareness by Information Technology Cell and the Department of Computer Science, in collaboration with Umang Welfare Foundation at Multani Mal Modi College Patiala on August 25, 2023.
- 5) Attended a lecture on 'Waste Management and Sanitation under the Campaign 'Swachhta Hi Seva' launched by Government of India College in collaboration with Municipal Corporation Patiala and Harpic India organized by Multani Mal Modi College Patiala on October 05, 2023.

Membership

1. Member Board of Studies (BOS) undergraduate course, Department of Botany, Punjabi University, Patiala for 2023-24.

Training course for B.Sc. Medical and Biotechnology students

- 1) Workshop on Modern Techniques in Science Organized by Department of Biological Sciences at Multani Mal Modi College Patiala (July 11-20, 2016).
- 2) Workshop on Modern Techniques in Biological Sciences Organized by Department of Biological Sciences at Multani Mal Modi College Patiala (July 21-28, 2017).
- 3) Workshop on Modern Techniques in Biological Sciences Organized by Department of Biological Sciences at Multani Mal Modi College Patiala (July 11-20, 2016).

Resources Developed

Blog : drsantosh29.wordpress.com