Biodata
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Date of Birth

August 10, 1951

Education

Ph D Meerut University, Meerut, 1979
M Phil Meerut University, Meerut, 1974
M Sc Meerut University, Meerut, 1972

Positions Held

Professor, CCS University, Meerut from 1999 to till date
Reader, CCS University, Meerut, from 1986 to 1999
Lecturer, Meerut University, Meerut from 1980 to 1986

Teaching Experience

Twenty-nine years experience of teaching of genetics, plant breeding, molecular biology & biotechnology, etc. at postgraduate and PhD levels.

Research Supervision

Successfully supervised eight PhD theses, more than 20 MSc thesis and 20 MPhil project reports. Currently supervising 10 PhD students.

Research Highlights

(1) **Study of induced genetic variability and breeding methods**: Using biometrical approaches, induced polygenic genetic variability was analyzed in terms of combining ability and gene effects for various traits in bread wheat. It was demonstrated that useful genetic variability may be induced for quantitative traits in wheat. Relative efficiency of biparental mating over selfing in wheat studied and the superiority of biparental mating was demonstrated for unlocking the genetic variability and for making gains during selection in wheat breeding.

(2) **Study of genetic diversity**: Genetic diversity and characterization of genetic variability was carried out both in wheat and different legume crops using data on phenotypic traits. In wheat it was demonstrated that molecular data along with data on phenotypic traits may be utilized for proper characterization of the genetic diversity in the available germplasm. Temporal changes in genetic diversity in the wheat varieties released over the past century is being studied. Contrary to the published reports, our initial results suggest that the modern plant breeding has not led to the narrowing of genetic diversity in Indian bread wheat germplasm.

(3) **Study of the effect of dwarfing genes in wheat:** Suitable genetic stocks like isogenic pairs and the isogenic lines for the three major dwarfing genes of wheat were prepared in the genetic background of a tall Indian bread wheat cv. K68. Using these material, the effect of three major dwarfing genes on various yield and yield related traits both under the optimal and water stress environments was studied. The role of dwarfing genes in modulating the tiller numbers was also examined.

(4) **Study of genome relationship and chromosome pairing**: Genome relationships among species of *Elymus*, *Agropyron*, *Hordeum*, Triticum, Secale Cereale and X Triticosecale was studied using meiotic analysis of wide hybrids recovered through embryo rescue. The role of pairing regulatory gene(s) in *Hordeum californicum* in the suppression of pairing between the homologous chromosomes of wheat was demonstrated for the first time.

(5) **Fluorescence in situ hybridization (FISH):** Physical mapping of the ribosomal RNA loci using FISH was carried out in cultivated and wild species of genus *Lens* (Balyan et al. 2002). FISH was also used to identify wheat cultivars carrying 1B/1R translocation and the results were confirmed using SSR analysis.

(6) **Development of SSRs in wheat and jute:** New simple sequence repeats (SSRs) were isolated, characterized and SSR markers were developed for both wheat and jute. A repertoire of more than 1000 SSRs has been created in jute, which makes the largest collection of SSR markers available anywhere in the world.

(7) **Preparation of molecular genetic maps in wheat:** Prepared for the first time in India three new molecular genetic maps in wheat using SSR, AFLP and SAMPL markers. These maps were used for QTL interval mapping and identification of markers linked with various grain quality, growth and yield traits.

(8) **Preparation of physical maps:** Physical maps of wheat chromosome bin maps were prepared using wheat and rye genomic and EST-SSRs. Radiation hybrid (RH) mapping is also being carried out for high resolution physical mapping in wheat.

(9) **Identification of molecular markers:** A number of molecular markers linked with major QTL for traits like grain protein content (GPC), pre-harvest sprouting tolerance (PHS), grain weight (GW), growth traits, yield and yield related traits in wheat have been identified following gene taggimng and interval mapping approcahes. As these traits are difficult to improve using conventional methods of plant breeding, these markers will prove extremely useful in wheat improvement through marker-assisted selection.

(10) **Molecular marker-assisted selection (MAS):** Using the markers developed in our laboratory and elsewhere, a number of high GPC lines (1.08 to 3.99% higher GPC over the recipient parents) in the genetic background of different elite Indian bread wheat cultivars have been developed through MAS by introgression of a major QTL for GPC, which are now under multi-location testing. We also developed white-grained (difficult to produce) and red-grained pre-harvest sprouting (PHS) tolerant and leaf rust resistant (*Lr24+Lr28*) wheat lines through MAS in the background of wheat. cv. HD2329, by pyramiding genes for leaf rust and the QTL for PHS tolerance for which the molecular markers were developed by us.

Current Research Interests

1. Study of the genome organization of wheat and barley
2. Development and use of molecular markers
3. Crop improvement through molecular marker assisted selection (MAS)
4. Fine mapping and map-based cloning of genes/QTLs of interest and their manipulation
5. Reverse genetics functional analysis through DEALING and TILLING
6. Transcriptome analysis
7. Physical mapping of DNA-based markers in wheat and comparative genome analysis involving rice and *Brachypodium*
8. Molecular mapping of fertility restorer gene (*Rf*) in wheat.
9. Molecular diversity and genetic analyses of *Zn* and iron content in wheat.
10. Radiation hybrid mapping for developing high resolution physical maps of wheat chromosome(s).
11. Structure and association analysis in Indian bread wheat cultivars and jute germplasm
12. Development of molecular markers, preparation of genetic maps and QTL analyses for fibre quality traits in jute.
13. Gene pyramiding for improved tolerance to abiotic stress in transgenic Indian mustard (*Brassica juncea* L.).
14. Tagging genes for fibre quality in cotton

Awards and Scholarships

2006 (August-October): NFS, USA Visiting Scientist at Department of Plant Sciences, North Dakota State University, Fargo, USA

2006 (April-June): INSA/DFG Exchange of Scientists Programme at Institute fur Pflanzengenetik und Kulturepflanzen-forschung, Correnstraβe 3, Gatersleben, Germany
2001 (Sept.-Nov.): INSA/DFG Exchange of Scientists Programme at Max-PlanInstitute at Koln
1995 (July-Oct.): INSA/DFG Exchange of Scientists Programme at Institute fur Pflanzengenetik und Kulturepflanzen-forschung, Correnstraβe 3, Gatersleben, Germany
1990 (June-Nov.): CIDA/NSERC Research Associateship (Government of Canada) at Department of Crop Science and Plant Ecology, University of Saskatchewan and Plant Biotechnology Institute, Saskatoon, Canada
1987 (June-Aug.): CIDA/NSERC Research Associateship (Government of Canada) at Plant Research Centre, CEF, Ottawa, Canada
1986 (June-Sept.): CIDA/NSERC Research Associateship (Government of Canada) at Plant Research Centre, CEF, Ottawa, Canada
1979-80: Council of Scientific and Industrial Research (Government of India) Post-doctoral Research Fellowship at Meerut University, Meerut
1978-79: Council of Scientific and Industrial Research (Government of India) Senior Research Fellowship at Meerut University, Meerut
1972-73: M. Phil. Merit Scholarship, Meerut University, Meerut

Fellowship of Academic Bodies

1. Fellow of the National Academy of Sciences, India (FNASc)
2. Fellow of the Indian Society of Genetics and Plant Breeding (FISG)

Membership of Academies Societies

1. Life member of the Indian Society of Genetics and Plant Breeding (FISG)
2. Life member of the Indian Society of Plant Genetic Resources (ISPGR)

Conferences and Symposia

Attended more than 20 national and international conferences/symposia in India and abroad

Current Research Projects (Total= 4)

- Co-Investigator (Co-PI) of a DBT sponsored three years duration (2007-2010) research project “Analysis of Host-Pathogen Interaction in Leaf Rust Infection of Wheat: A Transcriptmic Approach” (Total Rs. 46.56 lacs; Our share Rs. 16.80 lacs)
- Principal Investigator (PI) of a DBT sponsored three years duration (2006-2009) research project “Development of Molecular Markers and Molecular Map for QTL analysis in Jute” (Rs. 33.88 lacs)

- Principle Investigator (PI) of a DST sponsored three years duration (2006-2009) research project "Physical Mapping of Simple Sequence Repeats (SSRs) in Bread Whaet" (Rs. 35.29 lacs)
- Principal Investigator (PI) of a DBT sponsored three years duration (2004-2007) research project "Use of Molecular Marker Technology Approach in Wheat Quality Breeding" (Rs. 35.94 lacs)

Research Projects Completed (Total= 6)

- Completed as Principal Investigator (PI) of a BRNS sponsored three years (2003-2006) duration research project "Physical Mapping of SSRs of Chromosomes 1A, 2A and 3A of Bread Wheat Using Overlapping Deletions and Radiation Induced Breakage" (Rs. 22.84 lacs)
- Completeed as one of the Investigators of a NSF-USA sponsored three years (2005-2007) developing country collobration in plant genome research (India & USA): "Development of diploid wheat (*Triticum nonoccoccum*) deletion lines for reverse genetics" (US$ 96,628)
- Completed as Principal Investigator (PI) of a DBT sponsored four years duration (2002-2006) research project "Microsatellites in Wheat Genomics" (Rs.32.64 lacs)
- Completed as Principal Investigator (PI) a NATP-ICAR sponsored a three years (2000-2003) duration research project " Marker Aided Selection for Grain Quality Traits in Bread" (Rs. 45.0 lacs)
- Completed as senior most Co-Investigator (Co-PI) a five years (1995-2000) duration R&D project "Development of PCR-based hypervariable STMS Markers for Tagging Grain Quality Genes in Bread Wheat" (Rs.77.29 lacs)
- Completed as Co-Investigator (Co-PI) an ICAR sponsored research project "Use of Alien Genetic Variation in Wheat Improvement" (Rs.1.90 lacs)

Organization of Symposia and Training Programmes

Served as chairman, member of organizing committee or resource personnel in the following symposium, workshop and training programmes.

Symposium

1 "Molecular Basis of Plant Breeding" held at Ch. Charan Singh University, Meerut during 26-28 February, 2007
2 "National Seminar on Molecular Cytogenetics & Crop Breeding", held at Ch. Charan Singh University, Meerut during November 5-6, 2005
3 "Genetics and Biotechnology in Crop Improvement" held at Ch. Charan Singh University, Meerut during 14-16 February, 1997
4 "Advances in Genetics and Crop Improvement" held at Meerut University during 27-29 December, 1984

Workshop

1. Crop Technology Development Strategy Document (CTDS) Seminar on Wheat held at Ch. Charan Singh University, Meerut on January 6, 2008
2. Workshop on Databases, Data Mining and Retrieval of information held at Ch. Charan Singh University, Meerut during March 25-26, 2008

Training Programme

1. Department of Science & Technology, Govt. of India sponsored first contact programme on "Molecular Biology and Crop Biotechnology" held at Department of Agricultural Botany, Ch. Charan Singh University , Meerut during 2-14 September, 1996
2. Department of Science & Technology, Govt. of India sponsored second contact programme on "Application of Molecular Biology Techniques for Crop Improvement" held at Department of Agricultural Botany, Ch. Charan Singh University, Meerut

Contributions Towards Academic Upliftment of the Department

1. Help in revision and updating of M.Sc. and M. Phil. Syllabi
2. Preparation of practical manual for M. Sc. Students
3. Setting up of a molecular biology laboratory for M. Sc. Students under the UGC-SAP-DRS
4. Setting up of a bioinformatics laboratory under the BIF programme of DBT
5. Equipping laboratory through support from DST under the FIST programme

Academic Administration

1. Head Department of Genetics & Plant Breeding
2. Dean Faculty of Agriculture (second term completed)
3. Coordinator UGC-SAP-DRS programme
4. Coordinator Bioinformatics Infrastructure Facility (BIF)

University Administration

1. Serving as Dean Students Welfare
2. Served as Coordinator, Campus Admissions
3. Serving as Member of the University Executive Council
4. Served as University Proctor
5. Served as warden of Boys' Hostel

Reviewer of Scientific Journals

Indian journals

1. Indian Journal of Genetics and Plant Breeding
2. Journal of Plant Biochemistry & Biochemistry
3. Proceedings of National Academy of Sciences, India

Foreign journals

1. Euphytica
2. BMC Biology
3. Trends in Biotechnology
4. Plant Breeding

Member on Panel of Selection/Assessment Committees

1. Sardar Vallab Bhai Patel University of Agriculture & technology (SVPUA&T), Modipuram, Meerut
2. Defense Research & development Organization (DRDO) Recruitment and Assessment Board, Delhi
3. Banasthali Vidyapith, Banasthali, Rajasthan
4. National Bureau of Plant Genetic Resources, New Delhi

Research Publications

Full research papers

*Mohan A, Kulwal PL, Singh R, Kumar V, Mir RR, KumarJ, Prasad M, Balyan HS and Gupta PK (2008). Genome-wide QTL analysis for pre-harvest sprouting tolerance in bread wheat. Euphytica (accepted).

(Impact factor = 1.050)

*Mir R.R. , Rustgi S., Sharma S., R Singh, A. Gaur, A. K. Tyagi, H. Khan, M. K. Sinha, H. S. Balyan and P. K. Gupta (2008). A preliminary genetic analysis of fibre traits and the use of new genomic SSRs for genetic diversity in jute. Euphytica 161:413-427.

(Impact factor = 1.050)

Gupta P.K., Balyan H. S., Kulwal P.L., Kumar N., Kumar A., Mir R. R., Mohan A., Kumar J. (2007). QTL analysis for some quantitative traits in bread wheat. J. Zhejiaing Univ Sci B 8: 807-814.

*Kumar N., Kulwal P.L., Balyan H. S., Gupta P.K. (2007). QTL mapping for yield and yield component traits in two mapping populations of bread wheat. Mol Breed 19: 163-177.

(Impact factor = 2.14; Cited by 16)

Kumar J., Verma V., Shahi A.K., Qazi G. N., Balyan H. S. (2007). Development of simple sequeme repeats markers in *Cymbopogon* species. Planta Med 73: 262-266

(Impact factor = 1.84)

*Mohan A., Goyal A., Singh R., Balyan H. S., Gupta P. K. (2007). Physical mapping of wheat and rye expressed sequence tag-simple sequence repeats on wheat chromosomes. The Plant Genome (A supplement to Crop Sci.) 47: 3-13.

(Cited by 3)

Kumar N., Balyan H. S., Gupta R. K., Gupta P. K. (2006). Genetic analysis of grain protein content in bread wheat. J. Genet. & Breed. 60: 29-36.

*Kumar N., Kulwal P. L., Gaur A., Tyagi A. K., Khurana J. P., Khurana P., Balyan H. S., Gupta P.K. (2006). QTL analysis for grain weight in common wheat. Euphytica 151: 135-144

(Impact factor = 1.050; Cited by 9)

Roy JK, Bandopadhyay R, Rustgi S, Balyan HS, Gupta PK (2006). Association analysis of agronomically important traits using SSR, SAMPL and AFLP markers in bread wheat. Curr Sci 90: 683-689.

(Impact factor = 0.688; Cited by 3)

*Singh R, Kumar N, Bandopadhyay R, Rustgi S, Sharma S, Balyan HS, Gupta PK (2006). Development and use of anchored-SSRs to study DNA polymorphism in bread wheat (*Triticum aestivum* L.). Mol Ecol Notes 2:296-299.

(Impact factor = 1.257; Cited by 2)

*Balyan, H. S., Gupta, P. K., Rustgi, S., Bandopadhyay, R., Goyal, A., Singh, R., Kumar, A. Kumar, N. and Sharma, S. (2005). Development and use of SSRs of bread wheat for genetic and physical mapping and transferability to the species of *Triticum-Aegilops* complex. Czech J. Genet. Plant Breed. 41: 141-144.

(Impact factor: 1.092)

*Balyan HS, Gupta PK, Kulwal PL, Kumar N (2005). QTL analyses for three grain quality traits in bread wheat using intervarietal mapping populations. Czech J Genet Plant Breed 41: 281-283

(Impact factor: 1.092)

*Kulwal PL, Kumar N, Gaur A, Khurana P, Khurana JP, Tyagi AK, Balyan HS, Gupta PK (2005a) Mapping of a major QTL for pre-harvest sprouting tolerance on chromosome 3A in bread wheat. Theor Appl Genet 111:1052-1059.

(Impact factor = 3.137; Cited by 23)

Kulshreshtha R, N. Kumar, H.S. Balyan, P.K. Gupta, P. Khurana, A.K. Tyagi and J.P. Khurana (2005) Structural characterization, expression analysis and evolution of the red/far-red sensing photoreceptor gene, *PHYTOCHROME C* (*PHYC*), localized on the 'B' genome of hexaploid wheat (*Triticum aestivum* L.). Planta 221:675-689

(Impact factor = 3.058; Cited by 1)

Gupta P. K., S. Sharma, S. Kumar, H. S. Balyan, A. Beharav and E. Nevo (2004). Adaptive ribosomal DNA polymorphism in wild barley at a mosaic microsite, Newe Ya'ar in Israel. Plant Sci. 166: 1555-1563.

(Impact factor = 1.795; cited by 3)

*Kulwal, P.L., R. Singh, H.S. Balyan and P.K. Gupta (2004). Genetic basis of pre-harvest sprouting tolerance using single-locus and two-locus QTL analyses in bread wheat. Funct. & Integr. Genomics 4: 94-101.

(Impact factor = 4.180; Cited by 31)

Sharma, S., S. Kumar, H. S. Balyan, and P. K. Gupta (2004). Interlocus homogenization of ribosomal DNA repeat units in barley. Curr. Sci. 86:384-386.

(Impact factor = 0.688)

*Sharma, S. A. Beharav, H. S. Balyan, E. Nevo and P. K. Gupta (2004) Ribosomal DNA polymorphism and its association with geographical and climatic variables in 27 wild barley populations from Jordan. Plant Sci. 166:467-477.

(Impact factor = 1.795; Cited by 3)

*Bandhopadhyay, R., S. Sharma, S. Rustgi, R Singh, A. Gupta, H. S. Balyan and P. K. Gupta (2004). DNA polymorphism among 18 species of *Triticum-Aegilops* complex using wheat EST-SSRs. Plant Sci. 166:349-356.

(Impact factor = 1.795; Cited by 20)

*Roy, J. K., M. S. Lakshmikumaran, H. S. Balyan and P. K. Gupta (2004). AFLP-based genetic diversity and its comparison with diversity based on SSRs, SAMPL and phenotypic traits in bread wheat. Biochem. Genet. 42: 43-59

(Impact factor = 0.876; Cited by 10)

Singh T. and H. S. Balyan (2003). Relative efficiency of various single plant selection criteria and F_3 generation yield testing in wheat (*T. aestivum* L.). Indian J. Genet. 63: 24-29.

*Gupta, P. K., S. Rustgi, S. Sharma, R. Singh, N. Kumar and H. S. Balyan (2003). Transferable EST-SSR markers for the study of polymorphism and genetic diversity in bread wheat. Mol. Genet. Genomics 270: 315-323

(Impact factor = 2.978; Cited by 100)

Kumar, S., N. Kumar, H. S. Balyan, P. K. Gupta (2003). 1BL.1RS translocation in some Indian bread wheat genotypes and strategies for its use in wheat breeding. Caryologia 56: 23-30

(Impact factor = 0.194; Cited by 2)

*Prasad, M., N. Kumar, P. L. Kulwal, M. Roder, H. S. Balyan, H. S. Dhaliwal and P. K. Gupta (2003). QTL analysis for grain protein content using SSR markers and validation studies using NILs in bread wheat. Theor. Appl. Genet. 106: 659-667

(Impact factor = 3.137; Cited by 35)

*Kulwal, P. L., J. K. Roy, H. S. Balyan and P. K. Gupta (2003). QTL mapping for some growth and leaf characters in bread wheat. Plant Sci. 164: 267-277.

(Impact factor = 1.795; Cited by 10)

Sharma, S., H. S. Balyan, P. L. Kulwal, N. Kumar, R. K. Varshney, M. Prasad and P. K. Gupta (2002) Study of interspecific SSR polymorphism among 14 species of *Triticum-Aegilops* group. Wheat Information Service 95: 23-28.

(Cited by 8)

*Roy, J. K., H. S. Balyan, M. Prasad and P. K. Gupta (2002). Use of SAMPL for a study of DNA polymorphism, genetic diversity and possible gene tagging in bread wheat. Theor. Appl. Genet. 104: 465-472.

(Impact factor = 3.137; Cited by 18)

*Gupta, P.K., P. K. Sharma, H. S. Balyan, J. K. Roy, S. Sharma, A. Beharav. and E. Nevo (2002). Ploymorphism at rDNA loci in barley and its relation with climatic variables. Theor Appl Genet 104: 473-481.

(Impact factor = 3.137; Cited by 12)

*Gupta. P.K., H. S. Balyan, K. J. Edwards, P. Isaac, V. Korzun, M. Roder, M.-F. Gautier, P. Jourdrier, A. R. Schlatter, J. Dubcovsky, R. C. de la Pena, M. Khairallah, M. J. Hayden, B. Keller, R. C. C. Wang, J. P. Hardouin, P. Jack and P. Leroy (2002). Genetic mapping of 66 new SSR loci in bread wheat. Theor Appl Genet 105: 413-422.

(Impact factor = 3.137; Cited by 140)

*Balyan. H.S., A. Houben and R. Ahne (2002). Karyotype analysis and physical mapping of 18S-5.8S-25S and 5S ribosomal RNA loci in species of genus *Lens* Miller. Caryologia 55:121-128.

(Impact factor = 0.198; Cited by 3)

Kumar, S., H. S. Balyan, B. Ramesh, S. P. Singh and P. K. Gupta (2001) A study of nucleolar organizers in lentil using FISH and spore quartet analysis. Cytologia 66: 247-252.

*Varshney, R. K., M. Prasad, J. K. Roy, M. S. Roder, H. S. Balyan and P. K. Gupta (2001). Integrated physical maps of 2DL, 6BS and 7DL carrying loci for grain protein content and pre-harvest sprouting tolerance in bread wheat. Cereal Res. Comm. 29: 33-40.

(Impact factor = 1.190; Cited by 12)

*Harjit-Singh, M. Prasad, R. K. Varshney, J. K. Roy, H. S. Balyan, H.S. Dhaliwal and P. K. Gupta (2001). STMS markers for grain protein content and their validation using near-isogenic lines in bread wheat. Plant Breeding 120: 273-278.

(Impact factor = 0.954; Cited by 15)

*Prasad, M., R. K. Varshney, J. K. Roy, H. S. Balyan and P. K. Gupta (2000). The use of microsatellites for detecting DNA polymorphism, genotype identification and genetic diversity in wheat. Theor. Appl. Genet. 100: 584-592.

(Impact factor= 3.137; Cited by 129)

*Varshney, R. K., A. Kumar, H. S. Balyan, J. K. Roy, M. Prasad and P. K. Gupta (2000a). Characterization of microsatellites and development of chromosome specific STMS . Plant Mol. Bio. Rep. 18: 5-16.

(Impact factor= 0.921; Cited by 13)

*Varshney, R. K., M. Prasad, J. K. Roy, N. Kumar, Harjit-Singh, H. S. Dhaliwal, H. S. Balyan and P. K. Gupta (2000b). Identification of eight chromosomes and a microsatellite marker on 1AS associated with QTL for grain weight in bread wheat. Theor. Appl. Genet. 100: 1290-1294.

(Impact factor = 3.137; Cited by 24)

*Roy, J. K., M. Prasad, R. K. Varshney, H. S. Balyan, T. K. Blake, H. S. Dhaliwal, H. Singh, K. J. Edwards and P. K. Gupta (1999). Identification of a microsatellite on chromosome 6B and a STS on 7D of bread wheat showing association with preharvest sprouting tolerance. Theor. Appl. Genet. 99: 336-340.

(Impact factor = 3.137; Cited by 59)

*Prasad, M., R. K. Varshney, A. Kumar, H. S. Balyan, P. C. Sharma, K. J. Edwards, H. Singh, H. S. Dhaliwal, J. K. Roy and P. K. Gupta (1999). A microsatellite marker associated with a QTL for grain protein content on chromosome arm 2DL of bread wheat. Theor. Appl. Genet. 99: 341-345

(Impact factor = 3.137; Cited by 60)

Sharma, P. K., P. K. Gupta and H. S. Balyan (1998). Genetic diversity in a large collection of wheats (*Triticum* Spp.). Indian J. Genet. 58: 271-278.

*Balyan, H.S, and R. S. Lohia (1998). Pleiotropic effects of *Rht* dwarfing genes on grain yield and its component traits in wheat under rainfed environment. Indian J. Genet. 58: 169-176.

Varshney, R. K., P. C. Sharma, P. K. Gupta, H. S. Balyan, B. Ramesh, J. K. Roy, A. Kumar and A. Sen (1998). Low level of polymorphism detected by SSR probes in bread wheat. Plant Breeding 117: 182-184.

(Impact factor = 0.954; Cited by 6)

*Balyan, H. S. and Tejbir Singh (1997). The usefulness of biparental matings and geno-phenotypic selection for yield improvement in wheat (*Triticum aestivum* L.) Indian J. Genet. 57: 401-410.

Sen, A., H. S. Balyan, P. C. Sharma, B. Ramesh, A. Kumar, J. K. Roy, R. K. Varshney and P. K. Gupta. (1997). DNA amplification fingerprinting (DAF) as a new source of molecular markers in bread wheat. Wheat Inf. Serv. 85: 35-42. (Cited by 2)

Balyan, H. S. and M. N. Khan (1995). Comparison of three methods of handling the M_1 and M_2 generations in urdbean. Indian J. Pulses Res. 8: 109-112.

*Lee, Y. H., H. S. Balyan, B. J. Wang and G. Fedak (1994). Cytogenetic analysis of three *Hordeum* × *Elymus* hybrids. Euphytica 72: 115-119.

(Impact factor = 0.907)

*Balyan, H. S. and Omkar Singh (1994). Pleiotropic effects of GA-insensitive *Rht* genes on grain yield and its component characters in wheat. Cereal Res. Commn. 22: 195-200.

(Impact factor = 1.190; Cited by 2)

*Balyan, H. S. and G. Fedak (1991). A study of genome relationship in *Hordeum parodii*, *Hordeum jubatum, Elymus trachycaulum* and *Elymus canadensis*. Cytologia 56: 431-436.

(Cited by 1)

*Balyan, H. S. and G. Fedak (1990a). Hybrids of an amphiploids (*Triticum timopheevi* × *Hordeum bogdanii*) with cultivars of triticale (*X Triticosecale* Wittmack). Cytologia 55: 65-69.

*Balyan, H. S. and G. Fedak (1990b). Further evidence for the suppression of meiotic chromosome pairing by *Hordeum californicum*. Cytologia 55: 7-10.

*Balyan, H. S. and G. Fedak (1989). Meiotic study of hybrids between barley (*Hordeum vulgare* L.) and triticale (*X Tricosecale* Wittmack). J. Heredity 80: 460-463

(Impact factor = 1.964; Cited by 1)

*Gupta, P. K., H. S. Balyan and G. Fedak (1988). A study of genomic relationships of *Agropyron trachycaulum* and *Elymus scabriglumis*, *E. innovatus* and *Hordeum procerum*. Genome 30: 525-538.

(Impact factor = 1.785; Cited by 4)

*Singh, Tejbir and H. S. Balyan (1988). The usefulness of biparental matings in early segregating generation in wheat (*Triticum aestivum* L.). Genet. Agra. 42: 283-298.

*Balyan, H. S. and G. Fedak (1988). Suppression of homologous pairing between chromosome of A and B genomes of 4x and 6x wheats by *Hordeum californicum* Covas and Stebbins. Genome 30: 8-11.

(Impact factor = 1.785)

Balyan, H. S. and Tejbir Singh (1987). Character association analysis in common wheat (*Triticum aestivum* L.). Genome 29: 392-394

(Impact factor = 1.785)

Balyan, H. S. and M. V. Sudhakar (1985). Variability, character association and path coefficient studies on genotypes of early maturity group in pigeon pea. Madras Agric. J. 72: 168-172.

*Balyan, H. S. and A. K. Verma (1985). Relative efficiency of two mating systems and selection procedures for yield improvement in wheat (*Triticum aestivum* L.). Theor. Appl. Genet. 71: 111-118.

(Impact factor = 3.137)

Balyan, H. S. and P. K. Gupta (1982). Induced polygenic variability in bread wheat (*Triticum aestivum* L.). IV. Gene effects for three spike characters. J. Cytol. Genet. 17: 19-26.

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