

Curriculum vitae

Dr. Rattan S YADAV



ADDRESS FOR CORRESPONDENCE:

Dr Rattan S Yadav
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DISCIPLINE: Plant Genetics & Breeding, specialisation in Molecular Markers in plant Breeding

DATE OF BIRTH: 07 August 1960

MARITAL STATUS: married with one child

YEARS OF EXPERIENCE: 24 Years

PROFESSIONAL QUALIFICATIONS:

- 1994 PhD, University of Sussex, Brighton, UK
- 1983 MSc (Genetics), Haryana Agricultural University, Hisar, India, First class
- 1981 BSc (Hons) Agriculture, Haryana Agricultural University, Hisar, India, First class

LANGUAGES:

English, Hindi, Urdu and many of the regional languages spoken in Indian subcontinent

RESEARCH AND PROFESSIONAL EXPERIENCE:

The focus of Dr Yadav's research is to apply molecular markers in traits dissection and breeding leading to development of improved cultivars providing sustainable production and benefits to environments. In particular, he has strong research interests in the areas of drought tolerance and has extensively used genetic maps, markers and genomics technologies in dissecting complex traits contributing to crops yield under drought stress conditions. In collaboration with scientists at ICRISAT, his work has resulted in the identification, validation and breeding of a major QTL contributing to yield of pearl millet under terminal drought stress conditions. He is currently leading an interdisciplinary team of researchers from IBERS, ICRISAT, India and Ghana for fine mapping and characterisation of this important QTL and

develop gene-based markers for its efficient selection and breeding into the wider gene pool of pearl millet adapted to agro-climatic conditions of India and sub Saharan Africa. At IBERS, Dr Yadav is also leading a research programme focussing on genetic improvement of nitrogen use efficiency in perennial ryegrass (*Lolium perenne*) leading to reduced nitrogen losses to water from pastures and silo. He also holds a 'Collaborative Project with Scientists & Technologists of Indian Origin Abroad (CP-STIO)' award by the Department of Science and Technology, Govt of India, to facilitate marker assisted selection in crops grown in salt affected areas of India.

EMPLOYMENT HISTORY:

2004 - Present	Research leader, Plant Crop Genetics, Genomics and Breeding Division, Institute of Biological Environmental and Rural Sciences (IBERS), Aberystwyth University, SY23 3EB, UK
1996 – 2004	Project leader, Plant Genetics and Breeding Department, Institute of Grassland and Environmental Research (IGER), Aberystwyth, SY23 3EB, UK
1995 -1996	Post-doctoral Scientist/ Project Scientist, International Rice Research Institute (IRRI), Philippines
1991-1994	Association of Commonwealth Universities Fellow, University of Sussex, UK
1986-1991	Scientist (Plant Breeding), Indian Council of Agricultural Research; Central Soil & Water Conservation Research & Training Institute, Dehradun, India ((1986-1988), Central Soil Salinity Research Institute, Karnal, India (1988-1991)

MEMBERSHIP OF SOCIETIES

1. Life Member, Association for promotion of DNA fingerprinting and other technology
2. Life member EUCARPIA (European Association for Research on Plant Breeding)
3. Member British Grassland Society
4. Life member, Society of Soil and Water Conservationists
5. Member, Aberystwyth Cell Genetics Group

KEY EXPERIENCE:

- 1) Molecular marker-facilitated genetic and physiological dissection of traits contributing to enhanced economic (crop yield & quality aspects under stress and non-stress environments, low input agriculture, in particular drought, salinity, nutrient deficient soil) and environmental sustainability (reduced carbon, nitrogen and nitrate pollution from agriculture) of agriculture.
- 2) Application of molecular biology (in particular molecular markers) in genetic mapping, comparative mapping, QTL detection, location, and behaviour in different genetic backgrounds and environments
- 3) Marker assisted QTL introgression & plant breeding

- 4) Referee for numerous journals, funding agencies, external examiner for PhD thesis evaluation, lecturer on genetic mapping and marker assisted selection to national and international participants

OTHER PROFESSIONAL ACTIVITIES:

1. Ad-hoc Expert Agriculture - Forestry - Fisheries – Aquaculture, Research Directorate General European Commission, Brussels
2. Invited Speaker to Interdrought III – the 3rd International Conference on Integrated Approaches to Improve Crop Production Under Drought Prone Environments October 11 – 16, 2009, Shanghai, China
3. Collaborator/Advisor (2007-2010) to the Department of Science and Technology (DST), Govt of India, to strength, implement and enhance research and development in the areas of marker assisted selection in crops of importance to Central Soil Salinity Research Institute, Karnal, Haryana, India
4. International expert to an FAO/IAEA training courses: '*Molecular Markers And Screening Techniques For Abiotic Stress Tolerance In Black Pepper*', organised by the International Atomic Energy Agency (IAEA) at the Department of Export Agriculture, Matale, Sri Lanka, 30 August-3 September 2004
5. International expert and invited lecturer to an FAO/IAEA training courses: '*Mutation, Biotechnology and Screening Techniques for Tolerance to Salinity*', organised by the International Atomic Energy Agency (IAEA) at National Institute of Agricultural Botany (NIAB), Faisalabad, Pakistan, 26-30 April 2004
6. Invited faculty/ resource person on a 2 week hands-on training course on 'DNA markers: development and applications in genetic studies' organise by the *Association of DNA fingerprinting and other DNA technologies (ADNAT)*, Centre of Cellular and Molecular Biology (CCMB), Hyderabad, India, February 25-12 March 2004
7. Invited speaker at the workshop on *Molecular Markers for Plant Breeders*, *Plant, Animal & Microbe Genomes Conference X*, San Diego, California, January, 12-16, 2002, Marker assisted selection strategies to accumulate desirable QTLs in pearl millet
8. Invited speaker Gordon research conference on '*Salt and Water stress in Plants*', University of Oxford, UK, 15-19 July 2002, Using genetic maps, markers, and QTL information in understanding and improving drought tolerance in pearl millet
9. Using genetic maps and markers in pearl millet research. An invited seminar to the *Department of Biotechnology and Molecular Biology*, Chaudhary Charan Singh Haryana Agricultural University, Hissar, India, 19 February, 2001
10. Invited speaker to Rockefeller sponsored strategy planning workshops on use of *Molecular Approaches for the Genetic Improvement of Cereals for Stable Production in Water-limited Environments*", organised at IRRI (June 1998) and CIMMYT (June 1999)

OVER 90 PUBLICATIONS (Complete list available on request)

LIST OF KEY SELECTED PUBLICATIONS:

1. **Yadav R. S**, Sehgal, D. (2009) Molecular markers based approaches to drought tolerance. *Molecular Techniques in Crop Improvement* (2nd edition), Jain, S Mohan, Brar, D. S. (eds), *in press*
2. R. K. Kapila, R. S. Yadav, P. Plaha, K. N. Rai, O. P. Yadav, C. T. Hash, C. J. Howarth (2007) Genetic diversity among pearl millet maintainers using microsatellite markers. *Plant Breeding*. In press
3. Bidinger, F. R. , Nepolean, T. , Hash, C. T. , **Yadav, R. S.** , Howarth, C. J. (2007) Identification of QTLs for grain yield of pearl millet [*Pennisetum glaucum* (L.) R. Br.] in environments with variable moisture during grain filling. *Crop Science* 47, in press
4. **Yadav, R.S.**, Roderick, H.W. ,Sanderson, R. , Wilkins, P.W. (2007) Identification of genomic regions of *Lolium perenne* associated with resistance to a new crown rust pathogen population in the United Kingdom. 'Breeding and seed production for conventional and organic agriculture', pp 316-319, proceedings XXVI EUCARPIA Fodder Crops and Amenity Grasses Section and XVI Medicago spp. Group joint meeting, Perugia, Italy, 3-7 September 2006
5. Humphreys, M.W., **Yadav, R.S.**, Cairns, A.J., Turner, L.B., Humphreys, J. and Skot L. (2006) A changing climate for grassland research. *New Phytologist*, 169: 9-26
6. Humphreys, M. O. , Armstead, I. P. ,Donnison, I. S. , Humphreys, M. W. , King, I. P. , Thain, S. C. , Taylor, J. , Roderick, H. W. , Turner, L. B. , Skot, L. , Wilkins, P. W. , **Yadav, R.** (2006) New developments in genotyping and phenotyping for breeding improved sustainability in temperate forage grasses. *Breeding for Success: Diversity in Action*, pp 1091-1096, Proceedings of the 13th Australasian Plant Breeding Conference, Christchurch, New Zealand, 18-21 April 2006
7. Bidinger F.R., R. Serraj, S.M.H. Rizvi, C. Howarth, **R.S. Yadav** and C.T. Hash (2005) Field evaluation of drought tolerance QTL effects on phenotype and adaptation in pearl millet [*Pennisetum glaucum* (L.) R. Br.] topcross hybrids. *Field Crops Research* 94 (1), 14-32
8. Yadav, R. S., Bidinger, F. R., Hash, C. T., Cavan, G. P., Serraj, R., Howarth, C. J.(2005). Improving pearl millet drought tolerance. *Journal of SAT Agricultural Research*, 1, (1), 1-2
9. Serraj, R. , Hash, C. T. , Rizvi, S. M. H. , Sharma, A. , **Yadav, R. S.** , Bidinger, F. R. (2005) Recent advances in marker-assisted selection for drought tolerance in pearl millet. *Plant Production Science* 8(3), 332-335
10. **Yadav, R. S.** , Hash, C. T. , Bidinger, F. R. , Devos, K. M. , Howarth, C. J. (2004) Genomic regions associated with grain yield and aspects of post-flowering drought tolerance in pearl millet across stress environments and tester background. *Euphytica*, 136 (3): 265-277
11. **Yadav, R. S.**, Roderick, H.W., Lovatt, J.A., Skot, L. and Wilkins, P.W. (2003) Marker assisted breeding to enhance forage quality in ryegrass varieties. *Aspects of Applied Biology*, 70:183-186
12. Hash CT, **Yadav RS**, Sharma A, Bidinger FR, Devos, KM, Gale, MD, Howarth CJ, Chandra S, Cavan GP, Serraj R, Kumar PS, Breese WA, Witcombe JR (2002). Impact of pearl millet molecular marker research.

- In: PSP Annual Report 2002, Research Outcomes*, Department for International Development (DFID), pp 33-40
13. **Yadav RS**, Bidinger FR, Hash CT, Yadav YP, Bhatnagar SK and Howarth CJ (2002) Mapping and characterization of QTL x E interactions for grain and stover yield determining traits in pearl millet. *Theoretical and Applied Genetics* 106, 512-520
 14. Howarth C. J., **Yadav, R. S.** (2002) Successful marker assisted selection for drought tolerance and disease resistance in pearl millet. *IGER Innovations 2002*, Gordon, A. J., eds. 6: 18-21
 15. **Yadav RS**, Hash CT, Cavan GP, Bidinger FR, Howarth CJ (2002) Quantitative trait loci associated with traits determining grain and stover yield in pearl millet under terminal drought stress conditions. *Theoretical and Applied Genetics* 104, 67-83
 16. **Yadav RS**, Hash CT, Bidinger FR, Dhanoa, MS, Howarth CJ (2000). Identification and utilization of QTLs associated with drought tolerance in pearl millet (*Pennisetum glaucum* L.). pp 108-113, in the Proceedings of the International Strategic Planning Workshop on *Molecular Approaches for the Genetic Improvement of Cereals for Stable Production in Water-limited Environments* (Ribaut JM and Polland D, eds). A Strategic planning workshop held at CIMMYT, EL Batan, 21-25 June 1999. Mexico D.F.: CIMMYT
 17. Hash CT, **Yadav RS**, Cavan GP, Howarth CJ, Lui H, Qi X, Sharma A, Kolesnikova MA, Bidinger FR, Witcombe, JR (2000) Marker-assisted backcrossing to improve terminal drought tolerance in pearl millet (*Pennisetum glaucum* L.). PP 114-119 in the Proceedings of the International Strategic Planning Workshop on *Molecular Approaches for the Genetic Improvement of Cereals for Stable Production in Water-limited Environments* (Ribaut JM and Polland D, eds). A Strategic planning workshop held at CIMMYT, EL Batan, 21-25 June 1999. Mexico D.F.: CIMMYT
 18. Courtois B, McLaren G, Sinha PK, Prasad K, **Yadav R**, Shen, L. (2000) Mapping QTLs associated with drought avoidance in upland rice. *Molecular Breeding* 6, 55-66
 19. **Yadav R**, Courtois B, Huang N, McLaren G (1997) Mapping genes controlling root morphology and root distribution in a double-haploid population of rice. *Theoretical and Applied Genetics* 94, 619-632
 20. Courtois B, Chaitap W, Moolsri S, Sinha PK, Trebuil G, **Yadav R** (1996) Drought resistance and germplasm improvement: on going research of the upland rice consortium. Pp 154-175 in *Upland Rice Research in Partnership. IRRI Discussion Paper Series No. 16.* (Piggin, C., Courtois, B. and Schmit, V. eds). Proceedings of the Upland Rice Consortium Workshop. International Rice Research Institute, Los Banos, Manila, Philippines.
 21. **Yadav R**, Flowers TJ, Yeo AR (1996) Involvement of transpirational bypass flow in sodium uptake by high- and low sodium-transporting lines of rice developed through intravarietal selection. *Plant, Cell and Environment*. Vol. 19: 329-336
 22. **Yadav R**, Courtois B, Huang N (1996) RFLP mapping of genes controlling root morphology in an indica/japonica doubled haploid

- population. Pp 643-649 in *Rice Genetics III* (Khush, GS ed). International Rice Research Institute, Los Banos, Manila, Philippines.
23. **Yadav RS**, Dua RP (1989) Adapting crop plants to salinity stress. *Science Reporter*. Vol. 26 (7): 418-419
 24. **Yadav RS** (1989) Preliminary studies in seed germination behavior of *Simonsesia chinensis* (Link) Schneid. *Science and Culture*. Vol. 56(2): 87-89
 25. **Yadav RS**, Dua RP (1989) Adapting crop plants to salinity stress. *Science Reporter*. Vol. 26 (7): 418-419

RECENT RESEARCH GRANT AWARDS:

Principal investigator on a project entitled 'Integrating genomics and mapping approaches to improve pearl millet productivity in drought prone regions of Africa and Asia' BBSRC, total funds £742,106 over 4 years, 2008-2012.

Principal Investigator with Dr Parbodh Sharma on a Department of Science and Technology (DST), Govt of India funded Collaborative Project with Scientists & Technologists of Indian Origin Abroad Program (CP-STIO). The project covers aspects of integrating genomics and mapping approaches to improve crop productivity in salt environments (2007-2010).

Principal Investigator on a sub project 'Genetic improvement of perennial ryegrass and red clover to reduce N losses to water from pastures and silo' Defra-LINK, total funds £1.3M over a period of 5 years, 2008-2013.

Principal investigator on a project entitled, 'Identify new genes for nutritional quality and disease resistance in grasses to enhance the sustainability of UK grassland' awarded by Defra, total funds £572,936 over 4 years (July 2003 to June 2007).

Collaborating author on a research grant proposal entitled 'Making more miracles: Exploiting marker-assisted methods for pearl millet improvement'. (£380,974), successfully obtained by ICRISAT from the Live Stock Research Program of the DFID, UK, July 2002- June 2005.