




## University Faculty Details Page on DU Web-Site

Title	Prof.	First Name	Akshay Kumar	Last Name	Pradhan	Photograph
<b>Designation</b>	Professor					
<b>Department</b>	Department of Genetics					
<b>Address Office</b>	Department of Genetics, University of Delhi South Campus, Benito Juarez Road, New Delhi – 110021.					
<b>Residence</b>	1052, Joy Apartment, Plot No. 2, Sector 2, Dwarka Phase 1, New Delhi – 110075.					
<b>Phone No. Office</b>	24112322					
<b>Mobile</b>	9871748739					
<b>Fax</b>	24112761					
<b>Email</b>	pradhancgmcp@gmail.com					
<b>Education Qualifications</b>						
<b>Subject</b>	<b>Institution</b>				<b>Year</b>	
<b>Ph.D.</b>	Ph.D. (Genetics), Indian Agricultural Research Institute, New Delhi.				1986	
<b>PG</b>	M.Sc. (Plant Breeding & genetics), Orissa University of Agriculture & Technology, Bhubaneswar.				1980	
<b>UG</b>	B.Sc. (Agriculture), Orissa University of Agriculture & Technology, Bhubaneswar.				1978	
<b>Career Profile</b>						
<p>2002 – till date: Professor, Department of Genetics, University of Delhi, Delhi.</p> <p>1996 – 2002: Senior Research Scientist and Principal Scientist, National Dairy Development Board/DOFCO.</p> <p>1986 – 1996: Research Associate and Fellow, Tata Energy Research Institute (TERI), New Delhi.</p>						
<b>Administrative Assignments</b>						
<p>8<sup>th</sup> September, 2003 – 7<sup>th</sup> September, 2006: Head, Department of Genetics, University of Delhi.</p>						
<b>Areas of Interest / Specialization</b>						
<p>Plant Genetics and Molecular Plant Breeding.</p>						

## Subjects Taught

### ***Post Graduate level***

Population Genetics and Molecular Plant Breeding.

## Research Guidance

### ***Supervision of awarded Doctoral Thesis 4***

Ramchiary, Nirala. 2007. Molecular mapping of yield components and seed glucosinolate traits in *Brassica juncea*. University of Delhi.

Padmaja K. Lakshmi. 2008. Genome mapping and molecular dissection of seed coat colour trait in *Brassica juncea*. University of Delhi.

Kumar, Amarendra. 2009 submitted. Molecular mapping of gene(s) conferring resistance to *Alternaria* blight (*Alternaria brassicae*) in *Arabidopsis thaliana*. University of Delhi.

Yadava Satish Kumar. 2010 submitted. Development of integrated map and QTL dissection of yield components in *Brassica juncea*. University of Delhi.

### ***Supervision of Doctoral Thesis, under progress 6***

Rout, Kadambini. Genetic analysis of oil content and quality traits in *Brassica juncea*. University of Delhi (24. 07. 2009).

Sharma, Manisha. Molecular cloning and isolation of the gene responsible for propyl glucosinolate in *Brassica juncea* (05. 01. 2010).

Kajla, Sachin. Reduction of anti-feedant compound sinapine from the seeds of *Brassica juncea* through transgenic approach (05.01.2010).

Tanupriya. To study the role of bZIP transcription factors in *Dictyostelium discoideum* development (05. 01. 2010).

Dhaka, Namrata. Genetic dissection of some agronomically important traits in *Brassica juncea* (21.07.2010).

Yadav, Balgovind. Genetic dissection of yield and oil parameters in Brassica species (16.11.2012).

### ***Supervision of awarded M.Phil dissertations 2***

Bhatia, Varnika. 2005. Process of gene introgression through backcross breeding: A case study in *Brassica juncea*. University of Delhi.

Vaishali, Anushila. 2006. Study of genetic diversity in *Brassica juncea* using gene-specific markers. University of Delhi

#### **Publications Profile :**

##### ***Research papers Published in Refereed/Peer Reviewed Journals***

Yadava, S. K., Arumugam, N., Mukhopadhyay, A., Sodhi, Y. S., Gupta, V., Pental, D., Pradhan, A. K. (2012) QTL mapping of yield associated traits in *Brassica juncea*: Meta-analysis and epistatic interactions using two different crosses between east European and Indian gene pool lines *Theor. Appl. Genet.* 125:1553-1564

Pradhan, A. K., Pental D. 2011. Genetics of *Brassica juncea*. In R. Schmidt and I. Bancroft (eds), *Genetics and Genomics of the Brassicaceae*. pp 323 – 345, Springer International

Jagannath, A., Sodhi, Y. S., Gupta, V., Mukhopadhyay, A., Arumugam, N., Singh, I., Rohtagi, S., Burma, P. K., Pradhan, A. K., Pental, D. (2011) Eliminating expression of erucic acid-encoding loci allows the identification of 'hidden' QTL contributing to oil quality fractions and oil content in *Brassica juncea* (indian mustard). *Theor. Appl. Genet.* 122:1019 - 1103

Panjabi-Massand, P, S K Yadava, P Sharma, A Kaur, A Kumar, N Arumugam, Y S Sodhi, A Mukhopadhyay, V Gupta, A K Pradhan and D Pental. 2010. Molecular mapping reveals two independent loci conferring resistance to *Albugo candida* in the east European germplasm of oilseed mustard *Brassica juncea* *Theor. Appl. Genet.* 121:137-145.

Bisht, N C, V Gupta, N Ramchiary, Y S Sodhi, A Mukhopadhyay, N Arumugam, D Pental and A K Pradhan. 2009. Fine mapping of loci involved with glucosinolate biosynthesis in oilseed mustard (*Brassica juncea*) using genomic information from allied species. *Theor. Appl. Genet.* 118: 413-421.

Panjabi, P, A Jagannath, N C Bisht, K Lakshmi Padmaja, S Sharma, V Gupta, A K Pradhan and D Pental. 2008. Comparative mapping of *Brassica juncea* and *Arabidopsis thaliana* using Intron Polymorphism (IP) markers: homeologous relationships, diversification and evolution of the A, B and C Brassica genomes. *BMC Genomics.* 9:113.

Ramchiary, N, N C Bisht, V Gupta, A Mukhopadhyay, N Arumugam, Y S Sodhi, D Pental and A K Pradhan. 2007. QTL analysis reveals context-dependent loci for seed glucosinolate trait in the oilseed *Brassica juncea*: Importance of recurrent selection backcross (RSB) scheme for the identification of 'true' QTL. *Theor. Appl. Genet.* 116: 77-85.

Ramchiary, N, K L Padmaja, S Sharma, V Gupta, Y S Sodhi, A Mukhopadhyay, N Arumugam, D Pental and A K Pradhan. 2007. Mapping of yield influencing QTL in *Brassica juncea*: Implications for breeding of major oilseed crop of dryland areas. *Theor. Appl. Genet.* 115: 807-817.

Arumugam, N, V Gupta, A Jagannath, A Mukhopadhyay, A K Pradhan, P K Burma and D Pental. 2007. A

passage through *in vitro* culture leads to efficient production of true marker-free transgenic plants in *Brassica juncea* using the Cre-loxP system. *Transgenic Research*. 16: 703-712.

Bisht, N C, A Jagannath, P K Burma, A K Pradhan and D Pental. 2007. Retransformation of a male sterile barnase line with the barstar gene as an efficient alternative method to identify male sterile-restorer combinations for heterosis breeding. *Plant Cell Reports*. 26: 727-733.

Sodhi, Y S, A Chandra, J K Verma, N Arumugam, A Mukhopadhyay, V Gupta, D Pental and A K Pradhan. 2006. A new cytoplasmic male sterility system for hybrid seed production in Indian oilseed mustard *Brassica juncea*. *Theor. Appl. Genet.* 114: 93-99.

Lakshmi Padmaja, K, N Arumugam, V Gupta, A Mukhopadhyay, Y S Sodhi, D Pental and A K Pradhan. 2005. Mapping and tagging of seed coat colour and identification of microsatellite markers for marker assisted manipulation of the trait in *Brassica juncea*. *Theor. Appl. Genet.* 111: 8-14.

Gupta, V, A Mukhopadhyay, N Arumugam, Y S Sodhi, D Pental and A K Pradhan. 2004. Molecular tagging of erucic acid trait in oilseed mustard (*Brassica juncea*) by QTL mapping and SNPs in FAE 1 gene. *Theor. Appl. Genet.* 108: 743-749.

Sivaraman, I, N Arumugam, Y S Sodhi, V Gupta, A Mukhopadhyay, A K Pradhan, P K Burma and D Pental. 2004. Development of high oleic and low linolenic acid transgenics in a zero erucic acid *Brassica juncea* L. (Indian mustard) line by antisense suppression of the *fad2* gene. *Mol. Breeding*. 13: 365-375.

Srivastava, A, A Mukhopadhyay, N Arumugam, V Gupta, J K Verma, D Pental and A K Pradhan. 2004. Resynthesis of *Brassica juncea* (Czern) L. through interspecific crosses between *Brassica rapa* and *B. nigra*. *Plant Breeding*. 123: 204-206.

Pradhan, A K, V Gupta, A Mukhopadhyay, Y S Sodhi, N Arumugam and D Pental. 2003. A high-density linkage map in *Brassica juncea* using AFLP and RFLP markers. *Theor. Appl. Genet.* 106: 607-614.

Sodhi, Y S, A Mukhopadhyay, N Arumugam, J K Verma, V Gupta, D Pental and A K Pradhan. 2002. Inheritance pattern of total glucosinolate content in crosses involving a high glucosinolate Indian variety and a low glucosinolate line of *Brassica juncea*. *Plant Breeding*. 121: 508-511.

Jagannath, A, N Arumugam, V Gupta, A K Pradhan, P K Burma and D Pental. 2002. Development of transgenic *barstar* lines and identification of a male sterile (*barnase*) / restorer (*barstar*) combination for heterosis breeding in Indian oilseed mustard (*Brassica juncea*). *Curr. Sci.* 82: 46-52.

Arumugam, N, A Mukhopadhyay, V Gupta, Y S Sodhi, J K Verma, D Pental and A K Pradhan. 2002. Synthesis of somatic hybrids (RCBB) by fusing heat-tolerant *Raphanus sativus* (RR) and *Brassica oleracea* (CC) with *Brassica nigra* (BB). *Plant Breeding*. 121: 168-170.

Srivastava, A, V Gupta, D Pental and A K Pradhan. 2001. AFLP based genetic diversity assessment amongst agronomically important natural and some newly synthesized lines of *Brassica juncea*. *Theor. Appl. Genet.* 102: 193-199.

Verma, J K, Y S Sodhi, A Mukhopadhyay, N Arumugam, V Gupta, D Pental and A K Pradhan. 2000. Identification of stable maintainer and fertility restorer lines for 'Polima' CMS in *Brassica campestris*. *Plant*

*Breeding*. 119: 90-92.

Arumugam, N, A Mukhopadhyay, V Gupta, Y S Sodhi, J K Verma, D Pental and A K Pradhan. 2000. Somatic cell hybridization of 'oxy' CMS *Brassica juncea* with *B. oleracea* for correction of chlorosis and transfer of novel organelle combinations to allotetraploid brassicas. *Theor. Appl. Genet.* 100: 1043-1049.

Chrungu, B, N Verma, A Mohanty, A K Pradhan and K R Shivanna. 1999. Production and characterization of interspecific hybrids between *Brassica maurarum* and crop brassicas. *Theor. Appl. Genet.* 98: 608-613.

Rao, G U, A K Pradhan and K R Shivanna. 1998. Isolation of useful variants in alloplasmic crop brassicas in the cytoplasmic background of *Erucastrum gallicum*. *Euphytica*. 103: 301-306.

Arumugam, N, A Mukhopadhyay, V Gupta, D Pental and A K Pradhan. 1996. Synthesis of hexaploid (AABBCC) somatic hybrids: A bridging material for the transfer of 'tour' cytoplasmic male sterility to *Brassica* species. *Theor. Appl. Genet.* 92: 762-768.

Nagpal, R, S N Raina, Y S Sodhi, A Mukhopadhyay, N Arumugam, A K Pradhan and D Pental. 1996. Transfer of *Brassica tournefortii* (TT) genes to allotetraploid oilseed *Brassica* species (*B. juncea* AABB, *B. napus* AACC, *B. carinata* BBCC): Homoeologous pairing is more pronounced in the three genome hybrids (TACC, TBAA, TCAA, TCBB) as compared to diploids (TA, TB, TC). *Theor. Appl. Genet.* 92: 566-571.

Mukhopadhyay, A, N Arumugam, A K Pradhan, H N Murthy, B S Yadav, Y S Sodhi and D Pental. 1995. Somatic hybrids with substitution type genomic configuration TCBB for the transfer of nuclear and organelle genes from *Brassica tournefortii* TT to allotetraploid oilseed crop *Brassica carinata*. *Theor. Appl. Genet.* 89: 19-25.

Sodhi, Y S, A K Pradhan, J K Verma, N Arumugam, A Mukhopadhyay and D Pental. 1994. Identification and inheritance of fertility restorer genes for tour CMS in rapeseed (*Brassica napus* L.). *Plant Breeding*. 112: 223-227.

Pradhan, A K, Y S Sodhi, A Mukhopadhyay and D Pental. 1993. Heterosis breeding in Indian mustard (*Brassica juncea* (L.) Czern & Coss): Analysis of component characters contributing to heterosis for yield. *Euphytica*. 69 : 219-229.

Pental, D, A K Pradhan, Y S Sodhi and A Mukhopadhyay. 1993. Variation amongst *Brassica juncea* cultivars for regeneration from hypocotyl explants and optimization of conditions for *Agrobacterium* mediated genetic transformation. *Plant Cell Reports*. 12: 462-467.

Sodhi, Y S, A K Pradhan, A Mukhopadhyay and D Pental. 1993. Identification of stable maintainer line for Polima cytoplasmic male sterility in rapeseed (*Brassica napus* L.). *Plant Breeding*. 110: 334-337.

Sodhi, Y S, A K Pradhan, A Mukhopadhyay and D Pental. 1993. Stability of ogura cytoplasmic male sterility in three Indian cultivars of radish (*Raphanus sativus*). *Indian J. Agric. Sciences*. 63: 421-422.

Pradhan, A K, S Prakash, A Mukhopadhyay and D Pental. 1992. Phylogeny of genus *Brassica* and allied genera based on diversity of chloroplast and mitochondrial DNA. *Theor. Appl. Genet.* 85: 331-340.

Mukhopadhyay, A, N Arumugam, P B A Nandakumar, A K Pradhan, V Gupta and D Pental. 1992. *Agrobacterium* mediated genetic transformation of oilseed *Brassica campestris*: Transformation frequency

is strongly influenced by the mode of shoot regeneration. *Plant Cell Reports*. 11: 506-513.

Mukhopadhyay, A, R Topfer, A K Pradhan, Y S Sodhi, S S Steinbiss, J Schell and D Pental. 1991. Efficient regeneration of *Brassica oleracea* hypocotyl protoplasts and high frequency genetic transformation by direct DNA uptake. *Plant Cell Reports*. 10: 375-379.

Pradhan, A K, A Mukhopadhyay and D Pental. 1991. Identification of the putative cytoplasmic donor of a CMS system in *Brassica juncea*. *Plant Breeding*. 106: 204-208.

Mukhopadhyay, A, A K Pradhan, and D Pental. 1991. Mitochondrial DNA patterns are similar in gametosomatic and somatic hybrids of two *Nicotiana* species. *Plant Cell Reports*. 10: 522-524.

Pental, D, A K Pradhan and A Mukhopadhyay. 1989. Transmission of organelles in triploids produced by gameto-somatic fusions of two *Nicotiana* species. *Theor. Appl. Genet.* 78: 547-552.

Pental, D, A Mukhopadhyay, A Grover and A K Pradhan. 1988. A selection method for the synthesis of triploid hybrids by fusion of microspore protoplasts (n) with somatic cell protoplasts (2n). *Theor. Appl. Genet.* 76: 237-243.

#### Conference Organization/Presentations (in the last three years)

#### Research Projects (Major Grants/Research Collaboration)

**Name of Project:** Development of CMS/restorer lines in *Brassica* species for hybrid seed production and transfer of alternaria resistance from *B. carinata* to *B. juncea*.

**Position in Project:** Principal Investigator

**Period:** 1995-1996

**Funding Agency:** DBT

**Grant:** 35.0 lakhs

**Name of Project:** Tagging of fertility restorer genes for 'tour' cytoplasmic male sterility in *Brassica napus* with RAPD markers and their marker assisted transfer to *B. juncea*.

**Position in Project:** Principal Investigator

**Period:** 1995-1996

**Funding Agency:** DST

**Grant:** 12.0 lakhs

**Name of Project:** Investigations on cytoplasmic male sterility in *Brassica*.

**Position in Project:** Principal Investigator

**Period:** 1996

**Funding Agency:** Indo-French Centre for Promotion of Advanced Research.

**Grant:** 35.0 lakhs

**Name of Project:** Establishment of (a) Centre for Genetic Manipulation of Crop Plants (CGMCP) at the Department of Genetics, University of Delhi South Campus and (b) Research facilities at Mangolpuri for genetic engineering of oilseed mustard/rapeseed and selected vegetable crops

**Position in Project:** Co-Principal Investigator

**Period:** 2001-2016

**Funding Agency:** NDDB/ MDFVPL

**Grant:** 665.72 lakhs

**Name of Project:** Molecular mapping, tagging and development of high throughput DNA markers for some agronomically important traits in *Brassica juncea*.

**Position in Project:** Principal Investigator

**Period:** 2004-2010

**Funding Agency:** DBT

**Grant:** 66.01 lakhs

**Name of Project:** Tagging and marker assisted transfer of low glucosinolate trait in *Brassica juncea*.

**Position in Project:** Project Co-ordinator

**Period:** 2007-2010

**Funding Agency:** DBT

**Grant:** 61.91 lakhs

**Name of Project:** Molecular mapping and isolation of gene(s) from *Arabidopsis thaliana* conferring resistance to fungal pathogen *Alternaria brassicae* causing alternaria blight disease in oilseed mustard (*Brassica juncea*).

**Position in Project:** Co-Principal Investigator

**Period:** 2006-2010

**Funding Agency:** DBT

**Grant:** 52.72 lakhs

**Name of Project:** Centre of Excellence on genome mapping and molecular breeding of Brassicas.

**Position in Project:** Co-Team Leader

**Period:** 2009-2013

**Funding Agency:** DBT

**Grant:** 622.34 lakhs

**Name of Project:** Identification and manipulation of genetic factors involved in seed yield and oil content in rapeseed and mustard.

**Position in Project:** Principal Investigator

**Period:** 2009-2012

**Funding Agency:** DBT

**Grant:** 74.55 lakhs

**Name of Project:** To conduct confined field trials and biosafety studies on genetically engineered *Brassica juncea* (male sterility and restorer lines as pollination control mechanism) for heterosis breeding and yield improvement (under BIPP programme).

**Position in Project:** Key Investigator

**Period:** 2010-2014

**Funding Agency:** DBT

**Grant:** 800.0 lakhs

**Name of Project:** Development of low sinapine mustard (*Brassica juncea*) through anti-sense and RNAi technology

**Position in Project:** Principal Investigator

**Period:** 2012-2015

**Funding Agency:** DBT

**Grant:** 49.55 lakhs

**Name of Project:** Diversification of canola quality traits to some Indian cultivars of *Brassica juncea* through marker-assisted backcross breeding (MAB)

**Position in Project:** Principal Investigator

**Period:** 2013-2016

**Funding Agency:** DBT

**Grant:** 64.43 lakhs

#### **Awards and Distinctions**

Awarded Gold Medal for securing 1<sup>st</sup> Position in M.Sc.

Fellow of National Academy of Agricultural Sciences (FNAAS).

Fellow of National Academy of Sciences, Allahabad, India (FNASc)

Fellow Indian National Science Academy, New Delhi, India (FNA)

#### **Association with Professional Bodies**

##### **Reviewing**

Reviewer, Theoretical and Applied Genetics.

Reviewer, Plant Breeding.

Reviewer, Euphytica.

Reviewer, Genome.

Reviewer, Current Science.

Reviewer, Plant Cell Reports



Reviewer, Molecular Breeding

**Other Details**

**Member, Task Force, Agricultural Biotechnology, DBT, Govt. of India**

**Member, Task Force, Accelerated Crop Improvement Programme, DBT, Govt of India**

**Member, Review committee, Accelerated Crop Improvement Programme, DBT, Govt of India**

**Member, GEAC (Genetic Engineering Appraisal Committee), Ministry of Environment and Forest, Govt of India**

**(Signature of Faculty Member)**

**(Signature & Stamp  
of Head of the Department)**