

## Abbreviated Curriculum Vitae - Ian M. Ray

### **Education:**

Ph.D. 1989 Plant Breeding and Plant Genetics, University of Wisconsin-Madison.  
M.S. 1987 Plant Breeding and Plant Genetics, University of Wisconsin-Madison.  
B.S. 1985 Agriculture (Chemistry minor), New Mexico State University-Las Cruces.

### **Research Positions and Employment:**

1989-1993 Research Geneticist, USDA-ARS, Northern Great Plains Res. Lab, Mandan, ND.  
1994-2000 Assistant Professor, Dept. of Agronomy & Horticulture, New Mexico State Univ.  
2000-2006 Associate Professor, Dept. of Agronomy & Horticulture, New Mexico State Univ.  
2006-present Professor, Dept. of Plant & Environmental Sciences, New Mexico State Univ.

**Current Research Emphasis:** Genetic characterization and improvement of drought tolerance in alfalfa through molecular techniques and conventional breeding approaches.

### **Current\* and Previously Taught Courses (1994-2018):**

AGRO 610*	Advanced Plant Breeding	AGRO 365/365L	Principles Crop Production
GENE 315*	Molecular Genetics	AGRO 483	Sustainable Crop Production
GENE 440*	Genetics Seminar	AGRO/BIOL 486	Intermediate Genetics
GENE 486*	Genes and Genomes	GENE 305L	Genetic Tech. Laboratory

### **Graduate Student Advising (past 5 years):**

Harpreet Kaur and Arshdeep Singh Gill: current Ph.D. and M.S. candidates, respectively.  
Lovepreet Singh, M.S. degree completed 2017; Gina Babb, Ph.D. degree completed 2014; Nick Santantonio and Chris Pierce, M.S. degrees completed 2013.

### **Honors and Awards (past 5 years):**

2013-present Billy and Louis Melton Endowed Chair in Plant Breeding and Genetics (NMSU)  
2015 Donald C. Roush Excellence in Teaching Award (NMSU)  
2013 College of ACES Teaching Excellence Award (NMSU)

### **Funded Projects (past 5 years):**

Ray, IM (PI) and L. Yu. (2016-2021) Marker Assisted Breeding in Elite Alfalfa Germplasm to Enhance Biomass Productivity during Drought. Amount: \$381,108. Source: Alforex Seeds.  
Putnam, D. (PI) and I.M. Ray. (2014-2017) Subsurface Drip Irrigation, Deficit Irrigation Strategies, and Improved Varieties to Improve Alfalfa Water Use Efficiency under Drought Conditions. Amount: \$108,868. Source: USDA-NIFA.  
Ray, I.M. (PI). (2012-2015) DNA Marker Assisted Selection to Improve Alfalfa Production in Drought-Prone Environments. Amount: \$50,000. Source: Cal-West Seeds.

### **Selected Peer-Reviewed Publications From Among 54 Articles: (Graduate students underlined)**

Santantonio, N., C.A. Pierce, R.L. Steiner, and **I.M. Ray**. 2018. Genetic mapping of water-use efficiency and carbon and nitrogen metabolism in drought-stressed alfalfa. *Crop Sci.* In press.  
**Ray, I.M.**, M.J. Monteros, B. Julier, M.K. Sledge, and E.C. Brummer. 2018. Identification of consensus regions associated with shoot biomass production in the *Medicago* genome. *Crop Sci.* 58: 1037-1060.  
Wang, J., Y. Zhao, **I. Ray**, M. Song. 2016. Transcriptome responses in alfalfa associated with tolerance to intensive animal grazing. *Nature-Scientific Reports*. doi:10.1038/srep19438

- Ray, I.M.,** Y. Han, L. E. C.D. Meenach, N. Santantonio, M.K. Sledge, C.A. Pierce, T.M. Sterling, R.K. Kersey, et al. 2015. Identification of quantitative trait loci for alfalfa forage biomass productivity during drought stress. *Crop Sci.* 55:2012-2033.
- Ray, I.M.** C.A. Pierce, and C.G. Currier. 2012. Registration of ‘NuMex Bill Melton’ alfalfa for variable soil moisture environments. *J. Plant Registrations.* 6:137-140.
- Bhandari, H.S., A.H. Al Lawati, and **I.M. Ray**. 2011. AFLP marker diversity among high yielding perennial alfalfa core collection accessions. *Crop Sci.* 51: 1110-1121.
- Al Lawati, A., C.A. Pierce, L.W. Murray, and **I.M. Ray**. 2010. Combining ability and heterosis for forage yield among elite alfalfa core collection accessions possessing different fall dormancy responses. *Crop Sci.* 50:150-158.
- Fiore, C. J. Schroeder, S. Thomas, L. Murray, and **I. Ray**. 2009. Root-knot nematode-resistant alfalfa suppresses subsequent chile crop damage from the nutsedge-nematode pest complex. *Agron. J.* 101:754-763.
- Madril, C.M., C.A. Pierce and **I.M. Ray**. 2008. Heterosis among hybrids derived from genetically improved and unimproved alfalfa germplasm. *Crop Sci.* 48: 787-1792.
- Bhandari, H.S., C.A. Pierce, L.W. Murray, and **I.M. Ray**. 2007. Combining abilities and heterosis for forage yield among high-yielding accessions of the alfalfa core collection. *Crop Sci.* 47:665-673.
- Sledge, M.K., **I.M. Ray**, and G. Jiang. 2005. An expressed sequence tag SSR map of tetraploid alfalfa (*Medicago sativa* L.). *Theor. Appl. Genet.* 111:980-992.
- Segovia-Lerma, A., L.W. Murray, M.S. Townsend, and **I.M. Ray**. 2004. Population-based diallel analyses among nine historically recognized alfalfa germplasms. *Theor. Appl. Genet.* 109:1568-1575.
- Ray, I.M.**, A. Segovia-Lerma, and L.W. Murray. 2004. Diallel analysis of carbon isotope discrimination and its association with forage yield among nine historically recognized alfalfa germplasms. *Crop Sci.* 44:1970-1975.
- Segovia-Lerma, A., R.G. Cantrell, and **I.M. Ray**. 2003. AFLP-based assessment of genetic diversity among nine alfalfa germplasms using bulk DNA templates. *Genome* 46:51-58.
- Murray, L.W., **I.M. Ray**, H. Dong, and A. Segovia-Lerma. 2003. Clarification and re-evaluation of population-based diallel analyses: Gardner and Eberhart analyses II and III revisited. *Crop Sci.* 43:1930-1937.
- Ray, I.M.**, M.S. Townsend, J.A. Henning, C.G. Currier, and B.A. Melton. 2000. Registration of NM-9D11A-AN3 anthracnose resistant alfalfa germplasm with increased yield potential for water-limited environments. *Crop Sci.* 40:864.
- Ray, I.M.**, M.S. Townsend, J.A. Henning, C.G. Currier, and B.A. Melton. 1999. Registration of NM-9D11A-PRR3 phytophthora resistant alfalfa germplasm with increased yield potential for irrigated and water-limited environments. *Crop Sci.* 39:1537-1538.
- Ray, I.M.**, M.S. Townsend, and J.A. Henning. 1999. Heritabilities of water-use efficiency traits and correlations with agronomic traits in water-stressed alfalfa. *Crop Sci.* 39:494-498.
- Ray, I.M.**, M.S. Townsend, and J.A. Henning. 1998. Variation for yield, water-use efficiency, and canopy morphology among nine alfalfa germplasms. *Crop Sci.* 38:1386-1390.

**New Mexico Alfalfa Variety Test Reports (2013-2017):**

- Lauriault, L. M., **Ray, I.**, Pierce, C., Burney, O., Flynn, R. P., Marsalis, M. A., O'Neill, M. K. (2013-2017). *The New Mexico Alfalfa Variety Test Report*. Las Cruces, NM: Agricultural Experiment Station and Cooperative Extension Service, New Mexico State University.
- [http://aces.nmsu.edu/pubs/variety\\_trials/AVT17.pdf](http://aces.nmsu.edu/pubs/variety_trials/AVT17.pdf)      [http://aces.nmsu.edu/pubs/variety\\_trials/AVT16.pdf](http://aces.nmsu.edu/pubs/variety_trials/AVT16.pdf)
- [http://aces.nmsu.edu/pubs/variety\\_trials/AVT15.pdf](http://aces.nmsu.edu/pubs/variety_trials/AVT15.pdf)      [http://aces.nmsu.edu/pubs/variety\\_trials/AVT14.pdf](http://aces.nmsu.edu/pubs/variety_trials/AVT14.pdf)
- [http://aces.nmsu.edu/pubs/variety\\_trials/2013AlfalfaVarietyReport.pdf](http://aces.nmsu.edu/pubs/variety_trials/2013AlfalfaVarietyReport.pdf)