Dr. Jack C. McCarty, Jr.
ICAC Researcher of the Year - 2016

Name and Address

Name: Jack C. McCarty, Jr.

Position (s):
Research Agronomist, USDA/ARS
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Field of Research

Dr. McCarty's research area is Agronomy/Breeding with emphasis in expanding cotton's genetic diversity, conversion of photoperiodic primitive races of cotton to day-neutrality, germplasm enhancement for improved fiber quality, and breeding for root-knot and reniform nematode resistance.

Awards and Recognitions

S. No.	Year	Award/Recognition
1	2014	Senior Research Scientist of the Year, USDA-Agricultural Research Service, Mid-South Area.
2	2012	Alumni Achievement Award, College of Agriculture and Life Sciences, Mississippi State University.
3	2000	Outstanding Paper- Plant genetic resources, Crop Science Society of America "Simple Sequence Repeat-based Assessment of Genetic Diversity in Cotton Race Stocks" by S. Lui, R. G. Cantrell, J. C. McCarty, Jr. and J. McD. Stewart.
4	1997	Agronomist of the Year - Mississippi Chapter, American Society of Agronomy.
5	1990	Cotton Genetics Research Award – National Cotton Council of America.
6	1979	Outstanding Young Men of America.

Publications

1. Book chapters (as main author)

1. **McCarty, J. C., Jr**. and Percy, R. G. Genes from exotic germplasm and their use in cultivar improvement in *Gossypium hirsutum* L. and *G. barbadense* L. p. 65-80. **In** J. N. Jenkins and S. Saha (ed.) Genetic improvement of cotton - Emerging technologies. Science Publishers, Inc. Enfield, NH. 2001.

2. Book chapters (as co author/editor)

1. Hedin, P. A., Jenkins, J. N., **McCarty, J. C., Jr**., Parrott, W. L., Borazjani, A., Graves, C. H., Jr., and Filer, T. H. Effects of 1,1-dimethylpiperidinium chloride on the pests and allelochemicals of cotton and pecan. **In** Bioregulators - Chemistry and Uses. Amer. Chem. Soc. Symposium Series 257:171-191. 1984.
2. Hedin, P. A. and **McCarty, J. C., Jr**. Bioregulator-induced effects on the allelochemicals and agronomic traits of cotton. **In** Bioregulators for Crop Protection and Pest Control. Amer. Chem. Soc. Symposium Series 557:49-61. 1994.
3. Creech, R. G., Jenkins, J. N., Lawerence, G. W., and **McCarty, J. C., Jr.** Nematode resistance in cotton. pp. 250-259 I**n** Biotechnology in Agriculture and Forestry, Vol. 42 Cotton, Y. P. S. Bajaj (ed.). Springer- Verlag, Berlin Heidelberg. 1998.
4. Jenkins, J. N., Shappley, Z. W., Zhu, J. and **McCarty, J. C., Jr**. Molecular markers and quantitative traits in *Gossypium hirsutum* L. p. 123-136. **In** J. N. Jenkins and S. Saha (ed.) Genetic improvement of cotton - Emerging technologies. Science Publishers, Inc. Enfield, NH. 2001.
5. Saha, S., Stelly, D. M., Raska, D. A., Wu, J., Jenkins, J. N., **McCarty, J. C.**, Makamov, A., Gotmare, V., Abdurakhmonov, I. Y., and Campbell, B. T. Chromosome substitution lines: concept, development and utilization in the genetic improvement of upland cotton. Pp. 107-128. **In**. I. Y. Abdurakhmonov (ed.) Plant Breeding. InTech Open Access Publisher, Rijeka, Croatia. (Book Chapter). 2012.

3. Peer-reviewed research papers published

International: **2000-2016**

1. Liu, S., Cantrell, R. G., **McCarty, J. C., Jr**., and Stewart, J. McD. Simple sequence repeat-based assessment of genetic diversity in cotton race stock accessions. Crop Sci. 40: 1459-1469. 2000
2. Saha, Sukumar, Jenkins, J. N. and **McCarty, J. C., Jr**. A novel strategy for general sustainability and pest management in pest and pathogen resistant crops. Journal of New Seeds 2(3): 53-61. 2000.
3. Pettigrew, W. T., **McCarty, J. C., Jr**. and Vaughn K. C. Leaf senescence-like characteristics contribute to cotton's premature photosynthetic decline. Photosynthesis Research 65(2): 187-195. 2000.
4. **McCarty, J. C., Jr**. and Jenkins, J. N. Registration of 16 day length-neutral flowering primitive cotton germplasm lines. Crop Sci. 42:1755-1756. 2002.
5. *Gutierrez, O. A*., *Basu, S*., Saha, S., Jenkins, J. N., *Shoemaker, D. B*., *Cheatham, C.*, and **McCarty, J. C.** Genetic distance of cotton cultivars and germplasm lines based

on SSR markers and its association with agronomic and fiber traits of their F2 hybrids. Crop Sci. 42:1841-1847. 2002.

6. *Zhong, Ming*, **McCarty, J. C.**, Jenkins, J. N. and Saha, S. Assessment of day-neutral backcross populations of cotton using AFLP markers. J. Cotton Sci. 6:97-103. 2002.
7. *Zhang, Xiang-Dong*, Jenkins, J. N., Callahan, F. E., Creech, R. G., *Si, Y.*, **McCarty, J. C.**, Saha, S., and Ma, Din-Pow. Molecular cloning, differential expression, and functional characterization of a family of class I ubiquitin-conjugating enzyme (E2) genes in cotton (*Gossypium*). Biochimica et Biophysica Acta. 1625:269-279. 2003.
8. *Cheatham, C. L.*, Jenkins, J. N., **McCarty, J. C.**, Watson, C. E., and *Wu, J*. Genetic variance and combining ability of crosses of American cultivars, Australian cultivars, and wild cotton. J. Cotton Sci. 7:16-22. 2003.
9. *Wu, J.*, Jenkins, J. ,Zhu, J., **McCarty, J.**, and Watson, C. Monte Carlo simulations on marker grouping and ordering. Theor. Appl. Genet. 107:568-573. 2003.
10. *Wu, J.*, Jenkins, J. N., Zhu, J., **McCarty, J. C.**, and Watson, C. E. Comparisons of quantitative trait locus mapping properties between two methods of recombinant inbred line development. Euphytica. 132:159-166. 2003.
11. *Bezawada, C.*, Saha, S., Jenkins, J. N., Creech, R. G., and **McCarty, J. C.** SSR marker(s) associated with root knot nematode resistance gene(s) in cotton. J. Cotton Sci. 7:179-184. 2003

11. **McCarty, J. C.**, Jenkins, J. N., and *Wu, J*. Primitive accession derived germplasm by cultivar crosses as sources for cotton improvement: I. Phenotypic values and variance components. Crop Sci. 44: 1226-1230. 2004.
12. **McCarty, J. C.**, Jenkins, J. N., and *Wu, J*. Primitive accession derived germplasm by cultivar crosses as sources for cotton improvement: II. Genetic effects and genotypic values. Crop Sci. 44: 1231-1235. 2004.
13. McPherson, M. G., Jenkins, J. N., Watson, C. E., and **McCarty, J. C.** Inheritance of root-knot nematode resistance in M-315 RNR and M78-RNR cotton. J. Cotton Sci. 8: 154-161. 2004.
14. Saha, S., Wu, J., Jenkins, J. N., **McCarty, J. C.**, Stelly, D. M., Percy, R. G., Raska, D. A., and *Gutierrez, A. O*. Association of agronomic and fiber traits with specific 3-79 (*Gossypium barbadense*) chromosomes in a TM-1 (*G. hirsutum*) background of chromosome substitution lines. J. Cotton Sci. 8: 162-169. 2004.
15. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.**, and Zhu, J. Genetic association of yield and its component traits in a recombinant inbred line population of cotton. Euphytica 140:171-179. 2004.
16. Ulloa, M., Saha, S., Jenkins, J. N., Meredith, W. R., Jr., **McCarty, J. C., Jr**., and Stelly, D. M. Chromosomal assignment of RFLP linkage groups harboring important QTLs on an intraspecific cotton (*Gossypium hirsutum* L.) joinmap. J. of Heredity 96(2):132-144. 2005.
17. **McCarty, J. C.**, *Wu, J.*, Jenkins, J. N., and *Guo, X*. Evaluating American and China cotton cultivars and their crosses for improvement. Cotton Science 17(1):47-55. 2005
18. *Wu, J.*, Zhu, J., Jenkins, J. N., and **McCarty, J. C.** Constructing linkage maps with achiasmatic gametogenesis. Acta Genetica Sinica. 32(6)608-615. 2005.
19. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.**, and Watson , C. E. Comparison of two statistical models for evaluating boll retention in cotton. Agron. J. 97:1291-1294. 2005.

20. **McCarty, J. C.**, and Jenkins, J. N. Registration of 21 day length-neutral flowering primitive cotton germplasm lines. Crop Sci. 45: 2134. 2005.
21. *Wu, J.*, Wu, D., Jenkins, J. N., and **McCarty, J. C.** A recursive approach to detect multivariate conditional variance components and random effects. Computational Statistics and Data Analysis. 50:285-300. 2006.
22. Stelly, D. M., Saha, S., Raska, D. A., Jenkins, J. N., **McCarty, J. C.** and *Gutierrez, O. A*. Registration of 17 upland (*Gossypium hirsutum*) cotton germplasm lines disomic for different *G. barbadense* chromosome or chromosome arm substitutions. Crop Sci. 45:2663-2665. 2005.
23. **McCarty, J. C.**, and Jenkins, J. N. Registration of 14 primitive derived cotton germplasm lines with improved fiber strength. Crop Sci. 45:2668-2669. 2005.
24. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.** and Wu, D. Variance component estimation using the additive, dominance and additive x additive model when genotypes vary across environments. Crop Sci. 46:174-179. 2006.
25. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.**, Saha, S., and Stelly, D. M. An additive-dominance model to determine chromosomal effects in chromosome substitution lines and other germplasms. Theor. Appl. Genet. 112:391-399. 2006.
26. Saha, S., Jenkins, J. N., *Wu, J.*, **McCarty, J. C.**, *Gutierrez, O.*, Percy, R. G., Cantrell, R. G. and Stelly, D. M. Effects of chromosome-specific introgression in upland cotton on fiber and agronomic traits. Genetics 172:1924-1938. 2006.
27. Jenkins, J. N., *Wu, J.*, **McCarty, J. C.**, Saha, S., *Gutierrez O.*, Hayes, R. and Stelly, D. M. Genetic effects of thirteen *Gossypium barbadense* L. chromosome substitution lines in topcrosses with upland cotton cultivars: I. Yield and yield components. Crop Sci. 46:1169-1178. 2006
28. **McCarty, J. C.**, *Wu, J.*, and Jenkins, J. N. Genetic diversity for agronomic and fiber traits in day-neutral accessions derived from primitive cotton germplasm. Euphytica 148:283-293. 2006.
29. *Gutiérrez, O. A.*, Bowman, D. T., Cole, C. B., Jenkins, J. N., **McCarty, J. C.**, *Wu, J.*, and Watson, C. E. Development of random-mated populations using bulked pollen methodology: cotton as a model. J. Cotton Sci. 10:175-179 2006.
30. **McCarty, J. C.**, *Wu, J.*, Saha, S., Jenkins, J. N., and Hayes, R. Effects of chromosome 5sh from *Gossypium barbadense* L. on flower production in *G. hirsutum* L. Euphytica 152:99-107. 2006.
31. *Ynturi, P.*, Jenkins, J. N., **McCarty, J. C.**, *Gutiérrez, O. A.*, and Saha, S. Association of root-knot nematode resistance genes with SSR markers on two chromosomes in cotton. Crop Sci. 46:2670-2674. 2006.
32. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.**, *Zhong, M*. and Swindle, M. AFLP marker associations with agronomic and fiber traits in cotton. Euphytica 153:153-163. 2007.
33. **McCarty, J. C.**, *Wu, J.*, and Jenkins, J. N. Use of primitive derived cotton accessions for agronomic and fiber traits improvement: Variance components and genetic effects. Crop Sci. 47:100-110. 2007.
34. Jenkins, J. N., **McCarty, J. C.**, *Wu, J.*, Saha, S., *Gutierrez O.*, Hayes, R. and Stelly, D. M. Genetic effects of thirteen *Gossypium barbadense* L. chromosome substitution lines in topcrosses with upland cotton cultivars: II. Fiber quality traits. Crop Sci. 47:561-572. 2007.
35. Creech, R. G. Jenkins, J. N., **McCarty, J. C.**, Hayes, R., Creech, J. B., *Haire, D.*, and Cantrell, R. Registration of MS-01RKN, MS-24RKN, MS-30RKN, MS-33RKN, MS-

35RKN and MS-37RKN cotton germplasm lines with resistance to root-knot nematode. Journal of Plant Registrations 1:147-148. 2007.

36. **McCarty, J. C.**, *Wu, J.*, and Jenkins, J. N. Genetic association of cotton yield with its component traits in derived primitive accessions crossed by elite upland cultivars using the conditional ADAA genetic model. Euphytica 161:337-352. 2008.
37. *Guo, Y.*, **McCarty, J. C.,** Jenkins, J. N., and Saha, S. QTLs for node of first fruiting branch in a cross of an upland cotton, *Gossypium hirsutum* L., cultivar with primitive accession Texas 701. Euphytica 163:113-122. 2008.
38. Jenkins, J. N., **McCarty, J. C.**, *Gutierrez, O. A.*, Hayes, R. W., Bowman, D. T., Watson, C. E., and Jones, D. C. Registration of RMUP-C5, a random mated population of upland cotton germplasm. Journal of Plant Registrations 2:239-242. 2008.
39. Saha, S., Jenkins, J. N., *Wu, J.*, **McCarty, J. C.**, and Stelly, D. M. Genetic analysis of agronomic and fibre traits using four interspecific chromosome substitutions lines in cotton. Plant Breeding 127:612-618. 2008.
40. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.**, Saha, S., and Percy, R. Genetic associations of lint yield with its components in cotton chromosome substitution lines. Euphytica 164:199-207. 2008.
41. Siebert, M. W., Babock, J. M., Nolting, S., Santos, A. C., Adamczyk, J. J., Jr., Neese, P. A. King, J. E., Jenkins, J. N., **McCarty, J.**, Lorenze, G. M., Fromme, D. D., and Lassiter, R. B. Efficacy of Cry1F insecticidal protein in maize and cotton for control of fall armyworm (Lepidoptera: Noctuidae). Florida Entomologist 91(4):555-565. 2008.
42. *Wu, J.*, *Gutierrez O. A.*, Jenkins, J. N., **McCarty, J. C.**, and Zhu, J. Quantitative analysis and QTL mapping for agronomic and fiber traits in a RI population of upland cotton. Euphytica 165:231-245. 2009.
43. *Guo, Y.*, **McCarty, J. C.**, Jenkins, J. N., *An, C.*, and Saha, S. Genetic detection of node of first fruiting branch in crosses of a cultivar with two exotic accessions of upland cotton. Euphytica 166:317-329. 2009.
44. *Gutiérrez, O. A.*, Stelly, D. M., Saha, S., Jenkins, J. N., **McCarty, J. C., Jr.**, Raska, D. A., and Scheffler, B. E. Integrative placement and orientation of non-redundant SSR loci in cotton linkage groups by deficiency analysis. Mol. Breeding 23:693-707. 2009.
45. Wallace, T. P, Bowman, D., Campbell, T., Chee, P., *Gutierrez, O. A.*, Kohel, R. J., **McCarty, J.**, Myers, G., Percy, R. Robinson, F., Smith, W., Stelly, D., Stewart, J. M., Thaxton, P., Ullooa, M., and Weaver, D. B. Status of the USA cotton germplasm collection and crop vulnerability. Genet. Resour. and Crop Evol. 56:507-532. 2009.
46. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.**, and Thaxton, P. Seed trait evaluation of *Gossypium barbadense* L. chromosomes/arms in a *G. hirsutum* L. background. Euphytica 167:371-380. 2009.
47. Jenkins, J. N., **McCarty, J. C.**, Jr., *Wu, J.*, and *Gutierrez, O. A*. Genetic variance components and genetic effects among eleven diverse upland cotton lines and their F2 hybrids. Euphytica 167:397-408. 2009.
48. *Wu, J.*, **McCarty, J. C.**, Saha, S., Jenkins, J. N., and Hayes, R. Genetic changes in plant growth and their associations with chromosomes from *Gossypium barbadense* L. in *G. hirsutum* L. Genetica 137:57-66. 2009.
49. *An, C.*, Jenkins, J. N., Wu, J., Guo, Y., and **McCarty, J. C.** Use of fiber and fuzz mutants to detect QTL for yield components, seed, and fiber traits of upland cotton. Euphytica 172:21-24. 2010.

50. Saha, S., Wu, J., Jenkins, J. N., **McCarty, J. C.**, Hayes, R. and Stelly, D. M. Genetic dissection of chromosome substitution lines of cotton to discover novel *Gossypium barbadense* L. alleles for improvement of agronomic traits. Theor. Appl. Genet. 120:1193-1205. 2010.
51. *Wu, J.*, **McCarty, J. C.**, and Jenkins, J. N. Cotton chromosome substitution lines crossed with cultivars: genetic model evaluation and seed trait analyses. Theor. Appl. Genet. 120:1473-1483. 2010.
52. *An, C.*, Jenkins, J. N., **McCarty, J. C., Jr.**, and Saha, S. Atypical Ligon Lintless-2 phenotype in cotton. J. Cotton Sci. 14:13-16. 2010.
53. *Wu, J.*, **McCarty, J. C.,** Jenkins, J. N., and Meredith, W. R. Breeding Potential of Introgressions into Upland Cotton: Genetic Effects and Heterosis. Plant Breeding 129:526-532. 2010.
54. *Gutierrez, O. A.*, Jenkins, J. N., **McCarty, J. C.**, Wubben, M. J., Hayes, R. W., and Callahan, F. E. SSR markers closely associated with genes for resistance to root-knot nematode on chromosomes 11 and 14 of upland cotton. Theor. Appl. Genet. 121:1323-1337. 2010.
55. *Wu, J.*, Jenkins, J. N., **McCarty, J. C.**, and Saha, S. Genetic effects of individual chromosomes in cotton cultivars detected by using chromosome substitution lines as genetic probes. Genetica 138:1171-1179. 2010.
56. *Gutierrez, O. A.*, Robinson, A. F., Jenkins, J. N., **McCarty, J. C.**, Wubben, Callahan, F. and Nichols, R. Identification of QTL regions and SSR markers associated with resistance to reniform nematode in *Gossypium barbadense* L. accession GB713. Theor. Appl. Genet. 122:271-280. 2011.
57. Saha, S., Wu, J., Jenkins, J. N., **McCarty, J. C.,** Hayes, R. and Stelly, D. M. Delineation of interspecific epistasis on fiber quality traits in *Gossypium hirsutum* by ADAA analysis of intermated *G. barbadense* chromosome substitution lines. Theor. Appl. Genet. 122:1351-1361. 2011.
58. Wu, J., Jenkins, J. N., **McCarty, J. C**., and Lou, X. Y. Comparisons of four approximation algorithms for large-scale linkage map construction. Theor. Appl. Genet. 123:649-655. 2011.
59. Jenkins, J. N., **McCarty, J. C**., Wubben M., Hayes, R., Gutierrez, O. A., Callahan, F., and Deng W. SSR marker assisted selection of root-knot nematode (*Meloidogyne incognita*) resistant plants in cotton (*Gossypium hirsutum* L) Euphytica 183:49-54. 2012.
60. **McCarty, J. C., Jr.**, Jenkins, J. N., Wubben, M. J., Hayes, R. W., and LaFoe II, J. M. Registration of three germplasm lines of cotton derived from Gossypium hirsutum L. accession T2468 with moderate resistance to the reniform nematode. Journal of Plant Registrations. 6:85-87. 2012.
61. Jenkins, J. N., **McCarty, J. C., Jr.**, Wu, J., Hayes, R., and Stelly, D. Genetic effects of nine *Gossypium barbadense* L. chromosome substitution lines in topcrosses with five elite Upland cotton *G. hirsutum* L. cultivars. Euphytica 187:161-173. 2012.
62. Wu, J., Jenkins, J. N., **McCarty, J. C.**, and Glover, K. Detecting epistatic effects associated with cotton traits by a modified MDR approach. Euphytica 187:289-301. 2012.
63. Saha, S., Wu, J., Jenkins, J. N., **McCarty, J. C.**, and Stelly, D. Interspecific chromosomal effects on agronomic traits in *Gossypium hirsutum* by AD analysis using intermated *G. barbadense* chromosome substitution lines. Theor. Appl. Genet. 126:109-117. 2013.

64. Wu, J., Bondalapati, K., Glover, K., Berzonsky, W., Jenkins, J. N., and **McCarty, J. C.**, Genetic analysis without replications: model evaluation and application in spring wheat. Euphytica 190:447-458. 2013. DOI 10.1007/s10681-012-0835-5
65. **McCarty, J. C., Jr.**, Jenkins, J. N., Wubben, M. J., Gutierrez, O. A., Hayes, R. W., Callahan, F. E. and Deng, D. Registration of three germplasm lines of cotton derived from *Gossypium barbadense* L. accession GB713 with resistance to the reniform nematode. J. Plant Reg. 7:220-223. 2013. DOI:10.3198/jpr2012.08.0024crg
66. Jenkins, J. N., **McCarty, J. C., Jr.**, Gutierrez, O. A., Hayes, R. W., and Jones, D. C. Registration of RMBUP-C4, a random mated population with *Gossypium barbadense* L. alleles introgressed into Upland cotton germplasm. J. Plant Reg. 7:224-228. 2013. DOI:10.3198/jpr2012.08.0028crg
67. Thyssen, Gregory, **McCarty, J. C.**, Li, Ping, Jenkins, J. N. and Fang, D. D. Genetic mapping of non-target site resistance to a sulfonylurea herbicide (Envoke®) in Upland cotton (*Gossypium hirsutum* L.). Mol. Breeding 33:341-348. 2014. DOI 10.1007/s11032-013-9953-6
68. Zhang, J. F., Percy, R. G. and **McCarty, J. C., Jr.** Introgression genetics and breeding between Upland and Pima cotton: a review. Euphytica 198:1-12. 2014. DOI 10.1007/s10681-014-1094-4
69. Fang, D. D., Jenkins, J. N., Deng, D. D., **McCarty, J. C.**, Li, P., and Wu, J. Quantitative trait loci analysis of fiber quality traits using a random-mated recombinant inbred population in Upland cotton (*Gossypium hirsutum* L.) BMC Genomics 15;397. 2014. DOI: 10.1186/1471-2164-15-397
70. **McCarty, J. C., Jr.**, Jenkins, J. N., Gutierrez, O. A., and Hayes, R. W. Registration of RMPAP-C4 a random-mated primitive race accession cotton germplasm population**.** J. Plant Reg. 8: 313-317. 2014. DOI:10.3198/jpr2014.01.0004crg
71. Adeli, A., Read, J. J, **McCarty, J.**, Jenkins, J. N., and Feng, G. Soybean yield and nutrient utilization following long-term pellitized broiler litter application to cotton. Agron. J. 107:1128-1134. doi:10.2134/agronj14.0497
72. Bondalapati, K. D., Jenkins, J. N., McCarty, J. C. and Wu, J. Field experimental design comparisons to detect field effects associated with agronomic traits in upland cotton. Euphytica 206:747-757. 2015. doi 10.1007/s10681-015-1512-2
73. Nam, Sunghyun, Kim, H. J., Condon, B. D., Hinchliffe, D. J., Chang, SeChin, **McCarty, J. C.**, and Madison, C. A. High resistance to thermal decomposition in brown cotton is linked to tannins and sodium content. Published on line 12 Feb 2016. doi 10.1007/s10570-016-0871-8

Prior to 2000, Dr. McCarty published 90 peer review papers. In addition he has published 102 non peer papers.

Conferences Attended

Local

1. Mississippi Agricultural Consultants Association (1980 - present).
2. Mississippi Entomological Association (1976 - present)
3. Mississippi Chapter- American Society of Agronomy (1976 - present)
4. Mississippi Row Crops Short Course (1990 - present)

National:

1. Invited presentation on Bt transgenic cotton performance: International Plant Resistance to Insects, 1994, Stillwater, OK.
2. Invited presentation: Gustafson Plant Health Seminar, Beltwide Cotton Conferences, 1995, San Antonio, TX.
3. Invited panelist: Gaucho Data Overview: Beltwide Cotton Conferences, 1996, Nashville, TN.
4. Beltwide Cotton Production Conference (1977-present). Attended 35 meetings with 16 presentations.
5. Cooperative Regional Projects and Regional Information Exchange Groups: S-77, SRIEG-61, S-105, S-155, S-205 and S-304 (1973-present): Attended 36 meetings and made reports.
6. Cotton Incorporated Crop Management Seminar (1996-2005). Attended 4, participated in discussions.
8. National Association of Plant Breeders (2012-present).

International

1. Special invitation from the National Cotton New Technology Conference, **Zhejiang Agriculture University, Hangzhou, China,** Nov. 14-21, 1999, to present a series of lectures. Presentations were made as two four-hour sessions of the conference and subject areas were: 1) U.S. agricultural research systems and programs, 2) Diversity of primitive upland cotton germplasm, 3) Cotton pest resistance research, and 4) End of season cotton plant mapping.
2. International Plant Resistance to Insects-Biennial Workshop (1978-present). Attended 16 meetings made reports and participated in break-out sessions.
3. World Cotton Research Conference-2, 1998. **Athens, Greece.** Presentation "Diversity of primitive upland cotton germplasm" presented one paper and co-authored two.
4. World Cotton Research Conference 3, 2003. **Cape Town, South Africa**. Presentation "Primitive accession of cotton as genetic sources for improving yield and fiber properties" presented one and co-authored one.
5. World Cotton Research Conference 4, 2007. **Lubbock, Texas**. Presented one co-authored paper.
6. 4th International Crop Science Congress 2004, **Brisbane, Australia**. Presentation "Use of primitive accession in cotton improvement" presented one, co-authored one paper.
7. 18th EUCARPIA General Congress, 2008. **Valencia, Spain**. Presentation "Enhancement and diversity of primitive cotton, *Gossypium hirsutum* L., accessions" Made one presentation.
8. Special invitation from the **Director, Institute of Cereal & Oil Crops, Hebei Academy of Agricultural and Forestry Sciences, Shijaizhuang, China**, Sept. 03-09, 2015, to present lectures on: 1.) cotton genetic diversity and 2.) development of nematode resistance germplasm using Marker Assisted Selection.

Three most innovative achievements:

Achievement 1: Dr. McCarty developed 3 reniform nematode resistant lines from *G. barbadense* accession GB713, and transferred the resistance to elite *G. hirsutum* breeding lines which suppress nematode reproduction >90%.. He also developed three

lines, from *G. hirsutum* accession, T2468, which are moderately resistant to reniform nematode and are genetically diverse for fiber and agronomic traits. He co-authored a manuscript linking markers to GB713 resistance and a manuscript linking markers to root-knot nematode resistance. **Impact:** These discoveries provide resistance genes and molecular markers to two important nematodes in enhanced germplasm which allows industry to rapidly develop cultivars resistant to both nematodes.

Achievement 2: Dr. McCarty's innovative research developed over 500 germplasm lines involving primitive *G. hirsutum* accessions which represent new sources of plant genetic resistance to insects, nematodes, and diseases. He discovered primitive accessions with greater fiber strength, developed day-neutral lines, and determined their breeding value. To aid in his research a new biometrical genetic model was developed in cooperation with a post doc. Their research showed the importance of additive by additive epistasis for fiber quality. **Impact:** This germplasm greatly expanded genetic diversity available to cotton breeders including resources for developing high yielding cultivars with significantly improved pest resistance and fiber quality.

Achievement 3: Dr. McCarty co-developed plant mapping technology that shows the relative contribution of each fruiting site to final cotton lint yield. The relative contribution of first (66-75%), second (18-21%), and third (2-4%) position fruit was consistent across cultivars with a range of maturities with main stem nodal position of bolls varying by cultivar maturity. **Impact:** This research currently provides for effective crop management, quantifying the value of earliness in crop and pest control strategies. His plant mapping technique is currently the gold standard technique used by Industry to settle legal claims dealing with cotton fruiting and retention.

Biographical Sketch:

Jack C. McCarty, Jr., a sixth generation Mississippian, grew up on a homestead size family farm in east central Mississippi. The farm operation consisted of a small dairy, pastures, and row crops of cotton and corn. The corn provided silage and grain for the dairy animals and cotton was grown as a cash crop. Over the years the farm has transitioned to general livestock, hay, pastures, and timber production. McCarty attended nearby Enterprise High School and his graduation class consisted of 36 members. He continued his education by commuting to Jones County Junior College for two years and then transferred to Mississippi State University where he received a B.S. in Agronomy in 1968, M.S. (1971), and a PhD. (1974), with study emphasis in agronomy, plant breeding, and entomology. Both his thesis and dissertation problems involved cotton research projects. After working one year as a postdoctoral research associate, he joined USDA-ARS as a Research Agronomist. Dr. McCarty is an internationally recognized research scientist who has made significant contributions to cotton breeding worldwide through germplasm enhancement of primitive cotton accessions, discovery of pest resistant genes, development of pest resistant germplasm, through plant mapping, and field evaluation of genetically engineered pest resistant cotton. As a member of the Graduate Faculty at Mississippi State University he has mentored 50 M.S. or PhD. students by serving on their Graduate Advisory Committee. He has also mentored several young international scientists from China, Uzbekistan, and Azerbaijan who were Visiting Scientists with ARS. He is currently a member of an ARS research team which includes two Research Geneticists, a Research

Molecular Geneticist, and himself. During his long and distinguished career he has found time to give to his community and country. He served 29 Years in the Air Force Reserve and retired with the rank of Lieutenant Colonel.

Final Comments:

Dr. McCarty is very well known in cotton communities for providing leadership in research activities. The U.S. Upland cotton germplasm pool has been seriously eroded by over exploitation of a few elite lines over the past 30 years. The narrow genetic base of Upland cotton is one of the major constraints in its genetic improvement. However, the wild gene pools from *G. hirsutum* race stocks remain untapped, uncharacterized and underutilized. Dr. McCarty's day neutral conversion program opens a new paradigm in Upland cotton breeding programs to utilize gene pools from wild race stocks in the genetic improvement of Upland germplasm. Yield reduction in Upland cotton due to nematode infection is substantial and approaches $200 million dollars annually in the U.S. Dr. McCarty's research and germplasm are making major contributions towards reducing these losses. The incorporation of nematode resistance gene(s) into commercial cultivars has been hampered by the labor-intensive resistance screening process and lack of molecular markers tightly linked to resistance loci. The discovery of SSR markers associated with resistance genes provides a tool to overcome the problem of time consuming, costly, tedious screening process for resistance gene(s) in cotton. He was one of the two lead scientists who developed a strategy for the design for testing of transgenic Bt insect resistant cotton and partnered with industry to conduct the world's first field test of transgenic Bt insect resistant cotton. This design of Bt cotton testing is practiced in almost all cotton industries throughout the world. He has presented his research at national and International Forums. He has published 163 peer reviewed manuscripts and 102 non-peer reviewed papers. He has counseled numerous undergraduate/graduate students, and is always willing to spend time mentoring younger scientists. Former graduate students currently have successful careers with Dow Chemical, Phytogen Seeds, Bayer CropScience, Monsanto, and ARS to name a few. Dr. McCarty's research achievements and unique ability to work cooperatively across research disciplines.