
Professor Michael Terence ABBERTON

Curriculum Vitae

PERSONAL DETAILS

Date of birth: 18 October 1962
Place of birth: Bingley, West Yorkshire
Nationality: British

EDUCATION

BSc Hons Degree in Botany 1st Class, and D.H. Valentine Prize, University of Manchester (1984)

PhD, University of Manchester (1988)
Title: Chromosome specific behaviour in an autopolyploid series

CAREER TO DATE

1987-1990 Postdoctoral Researcher, Molecular Genetics Unit, University of St. Andrews: Cloning of nitrite reductase from Barley and studies of gene expression.

1990-1992 Project leader EEC funded project: 'Improvement of coffee with respect to the main diseases' Lunyangwa Agricultural Research Station, Mzuzu, Malawi, East Central Africa.

1993-1995 Higher Scientific Officer, Genetics Group, Institute of Grassland and Environmental Research (IGER). Department of Environment funded: 'Gene flow between genetically modified forage grasses and their wild relatives'

1995-1998 Higher Scientific Officer, Legume Breeding Group, IGER

1998-2001 Senior Research Scientist, Legume Breeding Group, IGER

2001- 2003 Leader, Legume Breeding Group, IGER

2003-2007 Principal Research Scientist and Team leader, Legume Breeding and Genetics, IGER

2007-2008 Programme Leader, Plant Breeding and Genetics, IGER

and IBERS

In April 2008 IGER merged with two departments of Aberystwyth University (AU) to form the Institute of Biological, Environmental and Rural Sciences (IBERS) within AU.

2008-2010	Head, Crop Breeding and Genomics IBERS
2010- 2012	Head, Genome Diversity and Plant Breeding Director of International Development IBERS Chair in Public Good Plant Breeding, Aberystwyth University
2012-	Head, Genetic Resources Centre, International Institute for Tropical Agriculture (IITA), Ibadan Nigeria

PUBLICATION LIST:

Refereed Journal Publications

1. Ward, M. P., **Abberton, M. T.**, Forde, B. G., Sherman, A., Thomas, W. I. B., Wray, J. L. (1995). The NiR 1 locus in barley is tightly linked to the nitrite reductase apoprotein gene Nii. *Molecular and General Genetics* **247**, 579-582
2. **Abberton, M. T.**, Callow, R. S. (1996). Nucleotypic influences on chromosome-specific chiasma variation in *Crepis capillaris*. I. Responses to early colchicine treatment and chromosome doubling. *Genome* **39**, 1078-1085.
3. Collins, R. P., **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Rhodes, I. (1997). Response to divergent selection for stolon characters in white clover (*Trifolium repens*). *Journal of Agricultural Science* **129**, 279-285.
4. Michaelson-Yeates, T. P. T., Marshall, A. H., **Abberton, M. T.**, Rhodes, I. (1997). Self-compatibility and heterosis in white clover (*Trifolium repens* L.). *Euphytica* **94**, 341-348.
5. **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Macduff, J. H. (1998). Characterization of novel inbred lines of white clover (*Trifolium repens* L.) in flowing solution culture. I. Dynamics of plant growth and nodule development in flowing solution culture. *Euphytica* **103**, 35-43.
6. Michaelson-Yeates, T. P. T., Macduff, J. H., **Abberton, M. T.**, Raistrick, N. (1998). Characterization of novel inbred lines of white clover (*Trifolium repens* L.) in flowing solution culture. II. Variation in N₂ fixation, NO₃⁻ uptake and their interactions. *Euphytica* **103**, 45-54.

7. Collins, R. P., **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Marshall, A. H., Rhodes, I. (1998). Effects of divergent selection on correlations between morphological traits in white clover (*Trifolium repens* L.). *Euphytica* **101**, 301-305.
8. Williams, T. A., **Abberton, M. T.**, Thornley, W. J., Evans, D. R., Rhodes, I. (1998). Evaluation of seed production potential in white clover (*Trifolium repens* L.) varietal improvement programmes. *Grass and Forage Science* **53**, 197-207.
9. Marshall, A. H., Holdbrook-Smith, K., Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Rhodes, I. (1998). Growth and reproductive characteristics in backcross hybrids derived from *Trifolium repens* L. X *T. nigrescens* Viv. interspecific crosses. *Euphytica* **104**, 61-66.
10. **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Marshall, A. H., Holdbrook-Smith, K., Rhodes, I. (1998). Morphological characteristics of hybrids between white clover *Trifolium repens* L., and Caucasian clover, *Trifolium ambiguum* M. Bieb. *Plant Breeding* **117**, 494-496.
11. Joyce, T. A., **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Forster, W. J. (1999). Relationships between genetic distance measured by RAPD-PCR and heterosis in inbred lines of white clover (*Trifolium repens*). *Euphytica* **107**, 159-165.
12. **Abberton, M. T.**, Macduff, J. H., Marshall, A. H., Michaelson-Yeates, T. P. T. (1999). Nitrogen fixation by hybrids of white clover (*Trifolium repens* L.) and *Trifolium nigrescens*. *Journal of Agronomy and Crop Science* **183**, 27-33.
13. Williams, T. A., **Abberton, M. T.**, Evans, D. R., Thornley, W. J., Rhodes, I. (2000). Contribution of white clover varieties in high-productivity systems under grazing and cutting. *Journal of Agronomy and Crop Science* **185**, 121-128.
14. **Abberton, M. T.**, Macduff, J. H., Vagg, S., Marshall, A. H., Michaelson-Yeates, T. P. T. (2000). Nitrogen fixation in hybrids of white clover (*Trifolium repens* L.) and Caucasian clover (*Trifolium ambiguum* M. Bieb). *Journal of Agronomy and Crop Science* **185**, 241-247.
15. Eason, W. R., Webb, K. J., Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Griffith, G. W., Culshaw, C. M., Hooker, J. E., Dhanoa, M. S. (2001). Effect of genotype of *Trifolium repens* on mycorrhizal symbiosis with *Glomus mossae*. *Journal of Agricultural Science* **137**, 27-36.
16. Williams, T. A., **Abberton, M. T.**, Thornley, W. J., Rhodes, I. (2001). Relationships between the yield of perennial ryegrass and of small leaved white clover under contrasting defoliation regimes. *Grass and Forage Science* **56** 231-237.
17. Marshall, A. H., Rasclé, C., **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Rhodes, I. (2001). Introgression as a route to improved drought tolerance in white clover (*Trifolium repens* L.). *Journal of Agronomy and Crop Science* **187**, 11-18.
18. **Abberton, M. T.**, J.H .Macduff, A. H. Marshall and T. P. T. Michaelson-Yeates (2001). Nitrogen fixation in hybrids of white clover. Plant Microbial Interactions: Positive Interactions in relation to crop production and utilisation. *Aspects of Applied Biology*, **63**, 67-70.
19. **Abberton, M.T.** A.H. Marshall, F. Minchin, T.P.T. Michaelson-Yeates and J.H. Macduff. (2001). Variation in nitrogen fixation between inbred lines of white clover.

Plant Microbial Interactions: Positive Interactions in relation to crop production and utilisation. *Aspects of Applied Biology*, **63**, 93-96.

20. Williams, T. A., **Abberton, M. T.**, Thornley, W. J., Rhodes, I. (2001). No relationship between leaf size and yield in medium leaf size white clover varieties under rotational sheep grazing and cutting. *Grass and Forage Science*, **56**, 412-417.
21. J.H. Macduff, **M.T. Abberton**, N. Raistrick and T.P.T. Michaelson-Yeates (2002). Nitrogen relations of a low nitrate uptake inbred line of white clover (*Trifolium repens* L.). *Plant and Soil*, **238**, 191-204.
22. J.-F. Soussana, F.R. Minchin, J.H. Macduff, N. Raistrick, **M. T. Abberton** and T.P.T. Michaelson-Yeates (2002). A simple model of feedback regulation for nitrate uptake and N₂ fixation in contrasting phenotypes of white clover. *Annals of Botany*, **90**, 139-147.
23. Marshall, A. H., Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Williams, T.A., Powell, H. G.(2002) Variation for reproductive and agronomic traits among *T. repens* x *T. nigrescens* third generation backcross hybrids in the field. *Euphytica* **126**: 195-201.
24. Marshall, A. H., Williams, T. A., Powell, H. G., **Abberton, M. T.**, Michaelson-Yeates, T. P. T. (2002) Forage yield and persistency of *T. repens* x *T. nigrescens* hybrids when sown with a grass companion. *Grass and Forage Science* **57**, 232-238.
25. **Abberton, M.T.**, Marshall, A.H., Michaelson-Yeates, T.P.T., Williams, T.A. and Rhodes, I. (2002) Quality characteristics of backcross hybrids between *Trifolium repens* and *Trifolium ambiguum*. *Euphytica* **127**, 75-80.
26. Williams, T. A., **Abberton, M.T.** and Rhodes, I. (2003) Performance of white clover varieties combined in blends and alone when grown with ryegrass under sheep and cattle grazing. *Grass and Forage Science* **58**, 90-93.
27. T. A. Williams, D. R. Evans, I. Rhodes and **M. T. Abberton** (2003) Long-term performance of white clover varieties grown with perennial ryegrass under rotational grazing by sheep with different nitrogen applications *Journal of Agricultural Science* **140**, 151-159.
28. Jones, E.S. L. J. Hughes, M. C. Drayton, **M. T. Abberton**, T. P.T. Michaelson-Yeates, C. Bowen and J. W. Forster(2003) An SSR and AFLP molecular marker-based genetic map of white clover (*Trifolium repens* L.) *Plant Science* **165**, 447-479.
29. **Abberton, M. T.**, Michaelson-Yeates, T.P.T., White, C., Marshall, A.H., Prewer, W. and Carlile, E. (2003) Bulk segregant AFLP analysis to identify markers for the introduction of the rhizomatous habit from *Trifolium ambiguum* into *T. repens* (white clover). *Euphytica* **134**, 217-222.
30. Marshall, A. H., Williams, A., **Abberton, M. T.**, Michaelson- Yeates, T. P. T., Powell, H. G. (2003) Dry matter production of white clover (*Trifolium repens* L.), Caucasian clover (*T. ambiguum* M. Bieb.) and their associated hybrids when grown with a grass companion over 3 harvest years *Grass and Forage Science* **58** (1), 63-69.
31. T.A. Williams and **M.T. Abberton** (2004) Earlier flowering between 1962-2002 in agricultural varieties of white clover *Oecologia* **138**, 122-126.

32. Marshall, A.H. Williams, T. A., **Abberton, M. T.**, Michaelson-Yeates, T.P.T., Olyott, P., Powell, H. G. (2004) Forage quality of white clover (*Trifolium repens* L.), Caucasian clover (*Trifolium ambiguum* M. Bieb.) hybrids and their grass companion when grown over three harvest years *Grass and Forage Science* **59** (1), 91-99.
33. **Abberton, M.T.** and Marshall, A. H. (2005) Progress in breeding perennial clovers for temperate agriculture . Centenary Review *Journal of Agricultural Science* **143**, 117-135.
34. Marshall , A.H. , Williams, T.A., Olyott, P., **Abberton, M.T.** and Michaelson-Yeates, T.P.T. (2005) Forage yield and persistency of *Trifolium repens* x *Trifolium nigrescens* hybrids under rotational sheep grazing *Grass and Forage Science* **60** (1), 68-73.
35. Cogan, N.O. I., **Abberton, M. T.**, Smith, K.F., Kearney, G., Marshall, A.H., Williams, A., Michaelson-Yeates, T.P.T. Bowen, C. , Jones, E.S., Vecchies, A.C. Forster J.W. (2006) Individual and multi-environment combined analyses identify QTLs for morphogenetic and reproductive development traits in white clover (*Trifolium repens* L.). *Theoretical and Applied Genetics* **112** (8), 1401-1415.
36. Murray, P. J. , Cheung, A. K. M. , **Abberton, M. T.** (2007) Intraspecific differences in *Trifolium pratense*; impact on feeding and host location by *Sitona lepidus* (Coleoptera, Curulionidae) *Journal of Pest Science* **80**, 51-57.
37. Febrer, M.; Cheung, F., Town, C. D., Cannon. S. B., Young, N. D., **Abberton, M. T.** Jenkins, G. and Milbourne, D. (2007) Construction, characterisation and preliminary BAC-end sequencing analysis of a bacterial artificial chromosome library of white clover (*Trifolium repens* L.) *Genome* **50**, 412-421.
38. **Abberton, M. T.** (2007) A review of interspecific hybridisation in the genus *Trifolium*. *Plant Breeding* **126**, 337-342.
39. Williams, T. A, **M.T. Abberton**, P. Olyott, K.A. Mizen and R. Cook (2007) Evaluation of the effects of resistance to stem nematode (*Ditylenchus dipsaci*) in white clover (*Trifolium repens* L.) under sheep grazing and cutting. *Plant Breeding* **126**, 343-346.
40. Andrews, M., Scholefield, D., **Abberton, M. T.**, McKenzie, B. A., Hodge, S., Raven, J. A. (2007) Use of white clover as an alternative to nitrogen fertiliser for dairy pastures in nitrate vulnerable zones in the UK: productivity, environmental impact and economic considerations. *Annals of Applied Biology* **151** (1), 11-23.
41. **Abberton, M T.**, Marshall, A.H., Humphreys, M.W., MacDuff, J., Collins R.P. and Marley, C. (2008) Genetic improvement of forage species to reduce the environmental impact of temperate livestock grazing systems. *Advances in Agronomy* **98**, 311-355.
44. Marshall, A. H., Michaelson-Yeates, T. P. T. and **Abberton, M. T.** (2008) Introgression of reproductive traits from *Trifolium nigrescens* increases the seed yield of white clover (*Trifolium repens* L.). *Plant Breeding* **127** 597-601.
45. Casey, N. M. Milbourne, D., Barth, S., Febrer, M., Jenkins, G., **Abberton, M.T.**, Jones, C and Thorogood, D. (2010) The genetic location of the self-incompatibility

locus in white clover (*Trifolium repens* L.). *Theoretical and Applied Genetics* **121**, 567- 576.

46. Hargreaves, S., Maxted, N., Hirano, R., **Abberton, M**, Skot, L. Ford-Lloyd, BV (2010) Islands as refugia of *Trifolium repens* genetic diversity. *Conservation Genetics* **11**, 1317-1326
47. Marshall, A. H., Lowe, M. J., **Abberton, M. T.**, Michaelson-Yeates, T. P. T. and Latypova, G. A. (2010) Response to moisture deficit of interspecific hybrids between *T. repens* and *T. ambiguum*. *Journal of Agronomy and Crop Science* (in press).
48. **Abberton, M. T.** and Thomas, I. (2011) Genetic resources in *Trifolium* and their use in plant breeding. *Plant Genetics Resources: Characterisation and Use* 9 38-44

Edited Book

Grassland Carbon Sequestration: Management, Policy and Economics.2010 Eds : Michael T. Abberton, Rich Conant, Caterina Batello FAO Rome 338

Contributions to books

1. Wray, J. L., **Abberton, M. T.** (1994). Molecular and applied aspects of nitrate assimilation. In: Basra, A. S. (ed.) *Mechanisms of Plant Growth and Improved Productivity*, 109-136. Marcel Dekker, New York.
2. Swain, D., Ohlsson, C., Peyraud, J. L., **Abberton, M. T.**, Zom, R., Martinsson, K. (2000). Forage 2000 - improving nutrient utilisation in ruminant production systems. In: Soergaard, K., Ohlsson, C., Sehested, J., Hutchings, N. and Kristensen, T. (eds) *Grassland Science in Europe*, **5**, 119-121. European Grassland Federation
3. Webb, K. J., **Abberton, M. T.** and Young, S. R. (2003) Molecular genetics of white clover. In: Jaiwal, P. K. and Singh, R. P. (eds) *Focus on Biotechnology: Applied Genetics of Leguminosae*. 239-253. Kluwer Academic Publishers, The Netherlands.
4. **Abberton, M.T.**, Skot, L and Theodorou M. K. (eds) (2004) *Crop Quality: Its role in sustainable livestock production*. Association of Applied Biology.
5. Pollock C. J., Humphreys, M. O., Morris, P., **Abberton, M. T.** and Humphreys, M. W. (2005). Biotechnological approaches to temperate forage improvement. In: G. Reynolds and J. Frame (eds) *UK FAO Grassland Future Perspectives*. Grasslands: Developments, Opportunities, Perspectives SFAO 281-302
6. **Abberton, M.T.**, Marshall, A., Collins, RP, Jones, C. and Lowe, M. (2009) QTL analysis and gene expression studies in white clover Molecular Breeding of Forage and Turf eds Yamada and Spangenberg 163-172 Sapporo Japan
7. **Abberton MT** (2010) Enhancing the role of legumes: potential and obstacles In: Grassland Carbon Sequestration: Management, Policy and Economics.2010 Eds : Michael T. Abberton, Rich Conant, Caterina Batello FAO Rome 338

8. Humphreys M.W., Marshall A.H., **Abberton M.T.** (2011). *Exploiting genetic and phenotypic plant diversity in grasslands*". In: Grassland Productivity and Ecosystem Services Gilles Lemaire, John Hodgson, Abad Chabbi. (Eds) Chapter 17.

Invited conference contributions

These contributions have been published in the conference proceedings of the relevant meeting.

National conferences

1. **Abberton, M. T.** (2006) Breeding forage legumes for sustainable and profitable farming systems. *Association of Applied Biologists Conference 'Delivering sustainability within profitable farming systems - is it possible?', Studley Castle, Warwickshire, 14-15 December 2006* (In conjunction with the British Society of Animal Science) Aspects of Applied Biology

International conferences

2. **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Marshall, A. H. and Rhodes, I. (1997). New approaches to legume improvement for sustainable agriculture. In: Boller, B., Stadelmann, F. J. (eds) *Breeding for a Multifunctional Agriculture, Proceedings of the 21st Meeting of the Fodder Crops and Amenity Grasses Section of Eucarpia, Kartause, Ittingen, Frauenfeld, Switzerland, 9-12 September 1997*, 91-93. Swiss Federal Research Station for Agroecology and Agriculture, Zurich-Reckenholz.
3. Webb, K. J. and **Abberton, M. T.** (1999). Molecular genetics of white clover. In: Sanchez-Diaz, N., Irigoyen, J. J., Aguirreolea, J., Pithan, K. (eds) *Crop Development for Cool and Wet Climate of Europe, COST 814 Workshop held at the University of Navarra, Pamplona, Spain, 19-21 October 1998*, 53-63. OOPEC Sales Agents, Luxembourg. ISBN 9282869474.
4. **Abberton, M. T.**, Michaelson-Yeates, T. P. T. and Marshall, A. H. (2000). Molecular marker analysis in white clover. In: Provorov, N. A., Tichonovich, I. A., Veronesi, F. (eds) *New Approaches and Techniques in Breeding Sustainable Fodder Crops and Amenity Grasses. Proceedings of the 22nd Eucarpia Fodder Crops and Amenity Grasses Section Meeting, St Petersburg, Russia, 17-21 October 1999*. Invited paper, 192-195. All-Russia Institute for Agricultural Microbiology, St Petersburg.
5. **Abberton, M.T.**, Cogan, N., Smith, K. F. Marshall, A.H., Williams, T.A, Michaelson-Yeates T.P.T., Bowen C., Jones, E.S., Vecchies, A. and Forster J.W. (2004) QTL analysis of morphogenetic and developmental traits in an SSR based genetic map of white clover (*Trifolium repens* L.) Forages Workshop. Plant and Animal Genome X11, San Diego, Jan 2004.

6. Pollock, C. J., **Abberton, M. T.**, Humphreys, M. O. (2005) Grass and forage improvement: temperate forages *Grassland: a Global Resource. Plenary and Invited Proceedings 20th International Grassland Congress, Dublin, Ireland, 26 June - 1 July 2005* McGilloway, D. A., eds., 57-68, Wageningen Academic Publishers.
7. **Abberton, M. T.** (2007) QTL mapping and gene expression studies in white clover. Plant and Animal Genome XV, San Diego Jan 2007. Invited presentation to Forage and Turf Workshop. Book of abstracts p. 31
8. **Abberton, M. T.**, Skot, L., Donnison, I.S., Oldroyd, G., Geurts, R. and Mayer K.(2007) Using translational genomics to underpin germplasm improvement for complex traits in crop legumes *Proceedings, 27th EUCARPIA Symposium on Improvement of Fodder Crops and Amenity Grasses, Copenhagen, 19-23 August 2007* Lubberstedt, T., eds
9. **Abberton, M.T.** (2008) Mitigation strategies for methane and nitrous oxide from the livestock sector-plant breeding, Invited Presentation at the Stanford University Global Change and Environment Programme workshop on Non CO₂ greenhouse gas emissions. August 26-27th 2008
(<http://gcep.stanford.edu/pdfs/WebAgenda.pdf>)
- 10 **Abberton M T.** (2011) Breeding for reduced environmental impact in livestock Systems. 3rd International Symposium on Forage Breeding. Bonito Brazil Nov 2011
- 11 **Abberton MT (2012)** Breeding perennial crops for climate change mitigation and adaptation. Invited Presentation Plant and Animal Genome Meeting San Diego, Jan 2012

Invited publications for FAO

1. **Abberton, M.T.**, MacDuff, J., Marshall, A.H. and Humphreys, M.W. (2007) The genetic improvement of forage grasses and legumes to enhance adaptation of grasslands to climate change. FAO publication.
(http://www.fao.org/documents/pub_dett.asp?lang=en&pub_id=243630)
2. **Abberton, M.T.**, MacDuff, J., Marshall, A.H. and Humphreys, M.W. (2007) The genetic improvement of forage grasses and legumes to reduce greenhouse gas emissions. FAO Publication
(http://www.fao.org/documents/pub_dett.asp?lang=en&pub_id=243631)

Contributed Conference Proceedings

1. Collins, R. P., Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Rhodes, I. (1996). Divergent selection for stolon characteristics in white clover. In: Younie, D. (ed.) *Legumes in Sustainable Farming Systems, British Grassland Society Occasional Symposium No 30 (Proceedings of joint conference of BGS and SFS Initiative, SAC, Craibstone, Aberdeen, 2-4 September 1996)*, 89-91. BGS, Reading, UK. ISBN 0905944399.
2. Michaelson-Yeates, T. P. T., Marshall, A. H., **Abberton, M. T.**, Rhodes, I. (1996). Self-fertility and hybrid vigour in white clover (*Trifolium repens* L.). In: Younie, D. (ed.) *Legumes in Sustainable Farming Systems, British Grassland Society*

Occasional Symposium No 30 (Proceedings of joint conference of BGS and SFS Initiative, SAC, Craibstone, Aberdeen, 2-4 September 1996), 86-87. BGS, Reading, UK. ISBN 0905944399.

3. Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Meredith, M. R., Marshall, A. H. (1996). Strategies for white clover improvement by interspecific hybridisation. In: Younie, D. (ed.) *Legumes in Sustainable Farming Systems, British Grassland Society Occasional Symposium No 30 (Proceedings of joint Conference of BGS and SFS Initiative, SAC, Craibstone, Aberdeen, 2-4 September 1996)*, 88. BGS, Reading. ISBN 0905944399.
4. Collins, R. P., Michaelson-Yeates, T. P. T., Fothergill, M., **Abberton, M. T.**, Rhodes, I. (1997). Comparison of the freezing tolerance of populations of white clover grown in a range of locations in Europe. In: Connolly, J., Nolan, T. (eds) *COST Action 814, Crop Development for the Cool and Wet Regions of Europe, Proceedings of the Progress Meeting of the Working Group on Overwintering and Spring Growth of White Clover, Dublin and Athenry, Ireland, 28-30 August 1997*, 63-65. Teagasc Agriculture and Food Development Authority, Ireland.
5. Michaelson-Yeates, T. P. T., Marshall, A. H., **Abberton, M. T.**, Rhodes, I. (1997). Heterosis in crosses between inbred lines of white clover. In: Weddell, J. R. (ed.) *Seeds of Progress, British Grassland Society Occasional Symposium No 31, Proceedings of the BGS/BSPB/NIAB/SAC Conference, Nottingham, UK, 18-19 February 1997*, 88-89. BGS, Reading, UK. ISBN 0905944496.
6. Michaelson-Yeates, T. P. T., Holdbrook-Smith, K., **Abberton, M. T.**, Meredith, M. R., Marshall, A. H. (1997). Introgression of genes into white clover from related species. In: Weddell, J. R. (ed.) *Seeds of Progress, British Grassland Society Occasional Symposium No 31, Proceedings of the BGS/BSPB/NIAB/SAC Conference, Nottingham, UK, 18-19 February 1997*, 86-87. BGS, Reading, UK. ISBN 0905944496.
7. Minchin, F. R., Macduff, J. H., Michaelson-Yeates, T. P. T., **Abberton, M. T.** (1997). Reduced nitrate sensitivity in white clover. *Biological Nitrogen Fixation for the 21st Century, the 11th International Congress on Nitrogen Fixation, Paris, France, 21-25 July 1997*.
8. Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Marshall, A. H. (1998). Exploiting recessive variation in white clover by using novel inbred lines. *Comparative Ecophysiology - Current Concepts and Research Opportunities, Joint Meeting of Pasture Ecology and Environmental Physiology Group, IGER Aberystwyth, 6-9 April 1998*.
9. **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Marshall, A. H., Rascole, C., Rhodes, I., Collins, R. P. (1998). Introgression of novel characteristics from *Trifolium ambiguum* into *Trifolium repens* by interspecific hybridisation. *Keeping the Balance, British Grassland Society (BGS) Winter Meeting, Peebles, Scotland, UK, 30 November - 1 December 1998*, 11.1-11.2.
10. Eason, W. R., Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Culshaw, C. M., Griffith, G. W. (1998). Response of near-isogenic lines of *Trifolium repens* to *Glomus mossae* and their potential use in molecular studies of the arbuscular mycorrhizal (AM) symbiosis. *Proceedings of the Second International Conference on Mycorrhizae, Uppsala, Sweden, 5-10 July 1998* <http://www-icom2.slu.se/>. Sveriges Lanbruksuniversitat, Uppsala, Sweden.

11. Eason, W. R., Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Culshaw, C. M., Griffith, G. W. (1998). Response of near-isogenic lines of *Trifolium repens* to the arbuscular mycorrhizal fungus (AMF) *Glomus mossae*. *Annual Meeting of the Society for Applied Microbiology, Warwick, December 1998*.
12. Mizen, K. A., **Abberton, M. T.**, Cook, R. (1998). Stem nematode resistance in white clover and variation in nematode virulence. *Association of Applied Biologists Offered Papers in Nematology, London, 18 December 1998*.
13. Marshall, A. H., **Abberton, M. T.**, Michaelson-Yeates, T. P. T. (1999). New approaches to the genetic improvement of *Trifolium repens*. *Proceedings of the XVth Trifolium Conference, Madison, Wisconsin, USA*.
14. Marshall, A. H., Michaelson-Yeates, T. P. T., **Abberton, M. T.**, Rhodes, I., Williams, A. (1999). Improving the seed production potential of white clover (*Trifolium repens* L.) by interspecific hybridisation. In: Falcinelli, M., Rosellini, D. (eds) *Herbage Seed as a Key Factor for Improving Production and Environmental Quality. Fourth International Herbage Seed Conference, Perugia, Italy, 23-27 May 1999*, 37-41.
15. Webb, K. J., Eason, W. R., **Abberton, M. T.**, Michaelson-Yeates, T. P. T., Parniske, M., Teodosio, H. R., Hooker, J. (1999). Tools for unravelling genetic control of arbuscular mycorrhizal symbiosis in legumes. In: Augustijn, M., Augustijn, H. (eds) *Proceedings 9th International Congress on Molecular Plant Microbe Interactions, Wageningen, the Netherlands, 25-30 July 1999* abst no 11.14.
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Popular press articles

1. Marshall, A. H., Michaelson-Yeates, T. P. T., **Abberton, M. T.** and Rhodes, I. (1997). New clovers for the new millennium. In: Gordon, A. J. (ed.) *IGER Innovations* **1**, 30-33. IGER Aberystwyth. ISBN 070840586X.
2. **Abberton, M. T.**, Donnison, I. S., Morris, P., Ougham, H. J., Robbins, M. P. and Thomas, H. (2001). Tooling up for functional genomics. *IGER Innovations* **5**, 6-9.
3. **Abberton, M. T.**, Webb, K.J. and Young, S. R. (2002). Molecular genetics of white clover. *Agricultural Journal of the University of Wales, Aberystwyth*, **80**, 105-125.
4. Collins, R.P., Marshall, A.H. and **Abberton, M.T.** (2002). Strategies for improving stress tolerance in white clover. *IGER Innovations*, **6**, 24-29.
5. **Abberton, M. T.** (2005) White clover - the breeders' role. *Gwlad* October 2005, 45.
6. **Abberton, M. T.** (2005) The developing role of clovers in UK livestock production. *Aber Clover Management Guide*, 3. British Seed Houses Ltd.
7. **Abberton, M. T.**, Collins, R. P., Marshall, A. H., Webb, K. J. and Skot, L. (2005) New traits and new tools: forage and legume breeding post CAP reform. *IGER Innovations* **9**, 24-27.

8. **Abberton, M.T.** (2008) Facing the challenge of climate change: the role of plant breeding. *IBERS Knowledge Based Innovations*

Numerous articles have also appeared in the popular farming press.

OTHER OUTPUTS: NEW VARIETIES

VARIETIES

All of the varieties shown below have been placed on the Recommended List for England and Wales (and often other countries), have been fully commercialised, and have had significant on-farm impact. This is an ongoing process and others potential varieties are currently undergoing field evaluation. The red clover breeding programme re-commenced only around 10 years ago after a considerable period of being 'out of fashion'. Consequently, the number of new varieties listed below reflects that emphasis.

A recent independent report by DTZ concluded that the nitrogen savings from use of improved clovers developed by IBERS amounted to cost savings to UK farmers of £2.9M-£5.7M pa with significant public good benefits in terms of reduced nitrogen pollution of waterways and lower greenhouse gas emissions.

White Clover Varieties

- AberAce.*** Small leaf size, highly persistent white cover, the first and only variety to achieve top score on the NIAB index of ground cover
- AberCrest*** Small leaf white clover with early spring growth. This variety has performed well in the UK and other countries in Europe, particularly Scandinavia.
- AberPearl.*** Highly productive small leaf type of intensively grazed systems.
- AberGuard.*** The only variety of white clover with significant resistance to stem nematode.
- AberConcord*** . Medium leaf variety with early spring growth
- AberDai*** Medium leaf variety which has now become the NIAB control
- AberVantage*** Medium leaf size variety with good compatibility with a range of grasses.
- AberBoost.*** Large leaf type for lax cattle grazing or silage production.

Red Clover Varieties

AberRuby. The first variety from the new programme and one with low levels of phyto-oestrogens

AberClaret. A significant breakthrough in persistence, giving much higher yields in the fourth and fifth years.

AberChianti Shows exceptional yield and persistence

RESEARCH GRANT INCOME

Current research grant income as PI

- Plant Breeding and Genetics: BBSRC Strategic Programme Grant, 2008-2013. **Total: £6.65m**
- Translational Genomics in Legumes: BBSRC Responsive Mode Grant 2005-2010 ('ERANET') **Total: Euro 1.3m**
- Dissection of complex traits underpinning grass and clover improvement for environmental benefits: Defra Commission, 2008-2013. **Total: £957k**

Sustainable Livestock Production LINK 2008-2013 linked projects:

- Genetic improvement of perennial ryegrass and red clover to increase nitrogen use efficiency and reduce N losses from pastures and silo. Defra Sustainable Livestock Production LINK Grant 2008-2013. **Total: £1.01m**
- Genetic improvement of perennial ryegrass and white clover to increase the efficiency of nitrogen use in the rumen. Defra Sustainable Livestock Production LINK Grant 2008-2013. **Total £1.04m**
- Development of productive and persistent high quality forage grasses and white clover with increased water use efficiency and resilience to summer droughts. Defra Sustainable Livestock Production LINK Grant 2008-2013. **Total £773k**
- Genetic improvement of forage grasses and white clover to improve phosphorus use efficiency and reduce phosphorus losses to water from UK grasslands. Defra Sustainable Livestock Production LINK Grant 2008-2013. **Total £995k**

The above current grant income as PI equates to a total of approx £2.62m per annum, while the income to the whole Genome Diversity and Plant Breeding Theme equates to £5.54m per annum

OTHER INDICATORS OF ESTEEM

Membership of Journal Editorial Boards

- Journal of Agricultural Science
- Advances in Applied Biology

- Plant Genetic Resources: Characterisation and Use

Other contributions

- Consultant to FAO, USDA and EU
- Member BBSRC panel for review of responsive mode applications
- Reviewer for Defra, EU and other national programmes
- UK representative on EUCARPIA Forage and Turf Section Committee
- Member BSPB Forage Committee
- Organiser and first Steering Group Chair International Trifolium Network (ITN)
- Member R& D Committee British Society of Plant Breeders
- Member R&D Committee European Seed Association

RESEARCH POSTGRADUATE SUPERVISION

Research postgraduate students supervised and completed

- **Rozlaily Zainol** (Malaysian Government funded) Genome mapping in red clover. PhD successfully completed. 2005-2008
- **Melanie Febrer** (jointly with Dan Milbourne, Teagasc Ireland) (Walsh Fellowship) Genome mapping and characterisation of a BAC library in white clover. PhD successfully completed. 2005-2008

Ongoing research postgraduate students being supervised:

- **Serene Hargreaves** (jointly with Nigel Maxted and Brian Ford Lloyd, University of Birmingham) Genetic diversity in island populations of white clover. 2007-
- **Nora Casey** (Walsh Fellowship) Molecular genetic basis of self incompatibility in white clover 2007-
- **Jennifer Douglas** (BBSRC CASE) Development of red clover as a biorefinery feedstock 2009-

In addition to the above PhD students, I have supervised a large number of students undertaking research for a Masters level dissertation or an undergraduate dissertation, as well as supervising visiting ERASMUS students, LEONARDO students and visiting research workers.

INVOLVEMENT IN OUTREACH AND KNOWLEDGE TRANSFER

IBERS' breeding programmes are commercialised and marketed through alliances with seed companies: Germinal Holdings with respect to grasses and clovers, and Senova for oats. This requires regular contact and discussions concerning e.g. seed production, variety entry, performance at National List and Recommended List, overseas trials and listing. Germinal Holdings are the main commercial partners of the Sustainable Livestock LINK projects, but these also include the livestock levy boards (DairyCo, EBLEX, HCC, QMS, LMCNI) and the British Grassland Society, together with the IBERS Grassland Development Centre (GDC). Knowledge transfer is an important part of these projects, and I carry out annual training courses for seed merchants, talks to farmers and presentations at other events such as the recent RASE conference on the role of breeding in combating climate change. Together with partners, fact sheets, posters and DVDs are developed and distributed, and presentations made at various shows and events for farmers and other stakeholders.

I have been appointed to the newly established Plant Science Sector Committee of the Biosciences Knowledge Transfer Network sponsored by the Technology Strategy Board. This is focused on driving innovation in UK agriculture across the whole value chain and I will be presenting at the Biosciences KTN annual conference showing how we link public and private sectors and deliver both economic and environmental benefits with the very successful high sugar grasses as an example.

REFEREES

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