

## SHORT CURRICULUM VITAE

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## RÉSUMÉ OF CAREER

### Present position:

Honorary Senior Research Fellow, University of Liverpool.  
Principal Consultant, Ecological Restoration Consultants.

### University teaching :

Senior Lecturer, October 1996 until 30<sup>th</sup> September 2004 in the School of Biological Sciences. October 1989 until September 1996, Senior lecturer in the Department of Environmental and Evolutionary Biology. September 1968 until September 1989, lecturer in the Department of Botany at the University of Liverpool.

### Postdoctoral:

N.R.C. postdoctoral fellowship 1966-68 at the Department of Zoology, University of British Columbia.

### Postgraduate:

DSIR studentship at the Department of Agricultural Botany, University College of North Wales from 1963-66.

Ph.D. awarded by the University of Wales 1969.

### Undergraduate:

B.Sc. with Honours (Class 1) in Agricultural Botany  
Awarded by the University of Wales 1963.

## **Professional Memberships:**

Member of the Institute of Ecology and Environmental Management (MIEEM)  
Member of the British Ecological Society and the British Land Reclamation Society.

## **GRADUATE TEACHING AT LIVERPOOL UNIVERSITY**

- MSc. Programme in Environmental Impact Assessment, Lectures on post –mining restoration.
- MSc. in Restoration Ecology of Terrestrial and Aquatic Environments. (2000 –2004) Director of the MSc Programme.

Modules taught by me are listed below.

- Transferable skills and research techniques designing suitable restoration approaches.
- Restoration of contaminated land, waste tips and disturbed environments.
- Field course – survey methods, sampling of vegetation and use of the National Vegetation Classification (50% of module)

## **RESEARCH EXPERIENCE AND CONSULTANCY**

### **Dynamics and management of heathland vegetation and ecological restoration**

The aim of this work has been to examine the ecological effects of severe disturbance on heathland ecosystems and to formulate restoration procedures based on an understanding of the soils and species dynamics of ecosystems. Recent work involved collaboration with the NERC, CEH, Dorset Research Station to investigate colonisation by fauna and flora, and successional change (invasion by birch) in relation to habitat structure, soil chemistry and management practices including turf removal and burning. Studentships funded by SERC, NERC and ESRC contributed to this research.

Restoration ecology research has attracted finance from NERC, ESRC, industrial companies and local authorities. Work on the restoration of heathland vegetation on china clay wastes was supported by Imerys Group at various times during 25 years and work on restoration of heathland after

installation of pipelines was carried out in collaboration with the British Gas Corporation and Scottish Gas. Long-term experiments to establish moorland vegetation have been financed by the Central Electricity Generating Board (1980-86) and Amax-Hemerdon Ltd (1980-83). Research work has also been carried out for British Coal (1991-94) and Mid Glamorgan County Council (1992-94) to examine methods of restoring heather moorland vegetation on colliery wastes. A major project (re-creation of lowland heath in Dorset) was sponsored by British Petroleum International Ltd.

### **Establishment and management of woodland ecosystems on derelict land including phytoremediation of contaminated substrates.**

This research commenced in 1981 in collaboration with Gwent County Council, supported by a research grant from the Welsh Development Agency and with additional funds from the Welsh Office. The objective of the work was to examine experimentally the germination and establishment of tree and shrub seedlings as influenced by a range of management treatments including sowing leguminous shrub nurse species, input of mineral nutrients and the effect of competition from grasses as modified by herbicide treatments. Sites included colliery waste and road embankments. In addition to the study of plant colonisation and community dynamics, the project evolved to include investigation of the long-term effects of management on tree growth and species dynamics. The effect of the sown leguminous shrubs on soil development was investigated together with nitrogen mineralisation and nitrogen transfer to the tree seedlings. Other grants were obtained from the Welsh Office (1988) and Gwent County Council (1992) to support continuation of the research programme.

A substantial new research programme commenced in 1997 financed by English Partnerships (via Mersey Forest/Cheshire County Council) to examine constraints for the establishment of woodland on landfill sites based on an understanding of soil ecosystem functioning. This work evolved into investigation of the bioavailability of metal contaminants (e.g. Cu, Pb, Cd, As, Ni) occurring in brownfield site soils within Merseyside. Phytoremediation using willow and poplar cultivars has been investigated on eight sites including contaminated canal sediments. The research commenced in 1999 and is ongoing, supported by the North West Development Agency, the Mersey Forest and Warrington Borough Council and most recently by the Waste Resources Action Programme. This latest work examines the utilization of compost to create healthy soil ecosystems on derelict brownfield sites being developed for green end-uses.

More than 50 reports have been produced for industrial companies, government agencies and local authorities. A detailed list is available on request.

## **SELECTED GRANTS AND CONTRACTS**

Robinson, Jones Design Partnership Ltd /Borough of Wrexham Maelor. 1977-79. Rehabilitation of metalliferous mine waste at Minera and Fan mines.

Welsh Development Agency/Welsh Office and Gwent County Council 1981-87. Establishment of deciduous woodland on road embankments and derelict land.

The Bollihope Estate (Sheik M al Maktoom) 1986-1988. Mapping soils and vegetation of the grouse moor: recommendations for management of heather moorland to enhance the grouse carrying capacity.

Shell UK Exploration and Production Ltd. 1986-87. The environmental background to exploration for gas and oil in the Dee and Mersey estuaries.

Welsh Office 1988-1991. The creation of amenity woodland on roadsides by direct seeding. Field Trials

B.P. International Ltd 1988-1992. Re-creation of heathland on former arable land in Dorset.

Liverpool University Research & Development Fund. 1989-1992 The socio-economic context of agricultural and ecological change in the Lleyn peninsula, North Wales (jointly with the Geography Department).

Welsh Office 1991-1994. Creation and management of direct seeded woodland.

British Coal 1991-1994. Restoration of moorland vegetation on mined land in South Wales.

Mid Glamorgan C.C. 1992-1994. Restoration of heather vegetation on colliery spoil.

Isle of Man Government. 1992 – 1993. The IRIS Report. Baseline environmental survey: Terrestrial Ecology. Ecological Habitat and vegetation survey (in collaboration with Port Erin Marine Laboratory).

The Groundwork Trust and NERC 1992-1995. Introduction of herbaceous flora, shrubs and indigenous tree species into early successional woodland on colliery spoil.

The National Trust 1994-1996. Vegetation and soil characteristics of farmland with potential for reinstatement as heathland. Phase 1 survey report.

Gwent County Council 1994-1996. The creation of woodland landscapes on road embankments.

MAFF. 1995-1998. The control of *Molinia caerulea* on heather moorland. (jointly with R.H.Marrs).

European Union ERDF, Objective 1 1995-1998 Use of recycled resources for the establishment of woodland on derelict land and colliery sites in Merseyside.

English Partnerships/Mersey Forest 1997-2000 Soil and other environmental constraints for the establishment of woodland on landfill sites. (jointly with N. Dickinson LJMU).

Mersey Forest/ERDF Objective One 1999-2002. Remediation of contaminated brownfield sites utilising short rotation coppice. (jointly with N.Dickinson, LJMU).

Waste Recycling Environmental. 2000-2003. The potential for the sustainable use of compost in arable crop production. (in collaboration with Cheshire County Council).

Warrington Borough Council and North West Development Agency 2002-2005. Phytoremediation of contaminated canal sediments using tree species. (jointly with N.Dickinson, LJMU).

Wardell Armstrong. 2003. A vegetation survey, soil and ecological evaluation of mine spoil at Halkyn Mountain, Flintshire.

Manchester Airport 2003 – 2005. Experimental restoration of mesotrophic grasslands and woodland adjacent to the second runway. Field Experiments.

Waste Resources Action Programme 2005-2006. Utilisation of green waste compost for creation of healthy functioning soil ecosystems on brownfield sites. (Joint with Mersey Forest and Liverpool John Moores University)

## **SELECTED JOURNAL PUBLICATIONS**

A selection from a total of more than 110 publications.

Johnson, M.S., McNeilly, T. and Putwain, P.D. (1977). Revegetation of metalliferous mine spoil contaminated by lead and zinc. *Environmental Pollution*. **12**, 261-277.

Gillham, D.A. and Putwain, P.D. (1977). Restoring moorland disturbed by pipeline installation. *Landscape Design*, **119**, 34-36.

Johnson, M.S., Putwain, P.D. and Holliday, R.J. (1978). Wildlife conservation value of derelict metalliferous mine workings in Wales. *Biological Conservation*, **14**, 131-148.

Holliday, R.J., Gillham, D.A., Putwain, P.D. and Hogg, W. (1979). The restoration of heather moorland following severe disturbance - a case study of the installation of a gas pipeline in the Pentland Hills near Edinburgh. *Landscape Design*, **126**, 33-36.

Johnson, M.S. and Putwain, P.D. (1981). Restoration of native biotic communities on land disturbed by metalliferous mining. *Minerals and the Environment*, **3**, 67-85.

Jeffries, R.A., Bradshaw, A.D. and Putwain, P.D. (1981). Growth, nitrogen accumulation and nitrogen transfer by legume species established on mine spoils. *Journal of Applied Ecology*, **18**, 745-756.

Putwain, P.D., Gillham, D.A. and Holliday, R.J. (1982). Restoration of heather moorland and lowland heathland with special reference to pipelines. *Environmental Conservation*, **9**, 225-235.

Rice, K. and Putwain, P.D. (1987). *Dee and Mersey Estuaries; Environmental background*. Published by Shell U.K. Exploration and Production Limited. 42pp.

Putwain, P.D., Evans, B.E. and Kerry, S. (1988). The establishment of amenity woodland by direct seeding; management and weed control. *Proceedings of AAB/BES/ICF Conference, The Practice of Weed Control and Vegetation Management in Forestry, Amenity and Conservation Areas. Aspects of Applied Biology*, No.16., 63-72.

Putwain, P.D. and Gillham, D.A. (1988). Restoration of heather moorland. *Landscape Design*, **172**, 51-56.

Bradshaw, A.D., McNeilly, T. and Putwain, P.D. (1989). The essential qualities. In: *Heavy Metal Tolerance in Plants*, Ed. J. Shaw. C.R.C. Press Inc. 324-334.

Putwain, P.D. & Gillham, D.A. (1990). The significance of the dormant viable seed bank in the restoration of heathlands. *Biological Conservation*, **51**, 1-16.

Pywell, R.F., Webb, N.R. & Putwain, P.D. (1994). Soil fertility and its implications for the restoration of heathland on farmland in southern Britain. *Biological Conservation*, **70**, 169-181.

Pywell, R.F., Webb, N.R. & Putwain, P.D. (1995). A comparison of techniques for restoring heathland on abandoned farmland. *Journal of Applied Ecology*, **32**, 400-411.

Pywell, R.F & Putwain, P.D. (1996). Restoration and conservation gain. In: *Conservation Biology*, ( Ed. I.F. Spellerberg ). Longman, 201-221.

Pywell, R.F., Putwain, P.D. & Webb, N.R. (1996). Establishment of heathland vegetation on mineral workings. *Proceedings of AAB/BES/ICF Conference, Aspects of Applied Biology*, **44**, 285-292.

Fee, D.J., Putwain, P.D. & Walmsley, T.J. (1996). The establishment of naturalistic woodland plant communities on colliery spoil. *Proceedings of AAB/BES/ICF Conference, Aspects of Applied Biology*, **44**, 351-356.

Pywell, R.F., Putwain, P.D. & Webb, N.R. (1997). The decline of heathland seed populations following the conversion to agriculture. *Journal of Applied Ecology*, **34**, 354-366.

Skeffington, R.A., Wilson, E.J., Maltby, E.A., Immirzi, P & Putwain, P. D. Acid deposition and blanket mire degradation and restoration. In. *Blanket Mire Degradation: Consequences and Challenges*, eds. J. H. Tallis, R. Meade and P. D. Hulme. Macauley Institute, 1997, 29-37.

Hirst, R.A., Pywell, R.F., Putwain, P.D., & Marrs, R.H., (2000). Ecological impacts of military vehicles on chalk grassland. *Aspects of Applied Biology 58: Vegetation Management in Changing Landscapes* 293-298.

Dickinson, N.M., MacKay, J.M., Goodman, A. & Putwain, P.D. (2000). Planting trees on contaminated soils: Issues and Guidelines. *Land Contamination and Reclamation*, **8**, 87-101.

Rawlinson, H.A., Dickinson, N.M., (2000). Constraints to the establishment of community woodland on closed landfill sites. *Aspects of Applied Biology 58: Vegetation Management in Changing Landscapes* 123-128.

Hirst, R.A., Pywell, R.F., Marrs, R.H., & Putwain, P.D. (2003). The resistance of chalk grassland to disturbance. *Journal of Applied Ecology*, **40**, 368-379.

Manning, P., Webb, N.R. & Putwain, P.D. (2005). The role of soil phosphorus sorption characteristics in the dynamics of heathland ecosystems. *Ecosystems* (submitted).

Manning, P., Putwain, P.D. & Webb, N.R. (2004) Identifying and modelling the determinants of woody plant invasion of a heathland ecosystem. *Journal of Ecology*, **92**, 868-881.

Rawlinson, H., Dickinson, N., Nolan, P., & Putwain, P.D. (2004) Woodland establishment on closed old-style landfill sites in N W England. *Forest Ecology and Management*. 202, 265-280.

Hirst, R.A., Pywell, R.F.Marrs, R.H, & Putwain, P.D. (2005). The resilience of calcareous and mesotrophic grasslands following disturbance. *Journal of Applied Ecology*, **42**,

### **Book**

Putwain, P.D. and Rae, P.A.S. (1988). Heathland Restoration: A Review of Techniques. British Gas plc, (Southern) Southampton. 160pp.