

UK activities on breed conservation in relation to disease threats

European Livestock Breeds Ark and Rescue Net
(ELBARN) Workshop
6 March 2009, Ghent

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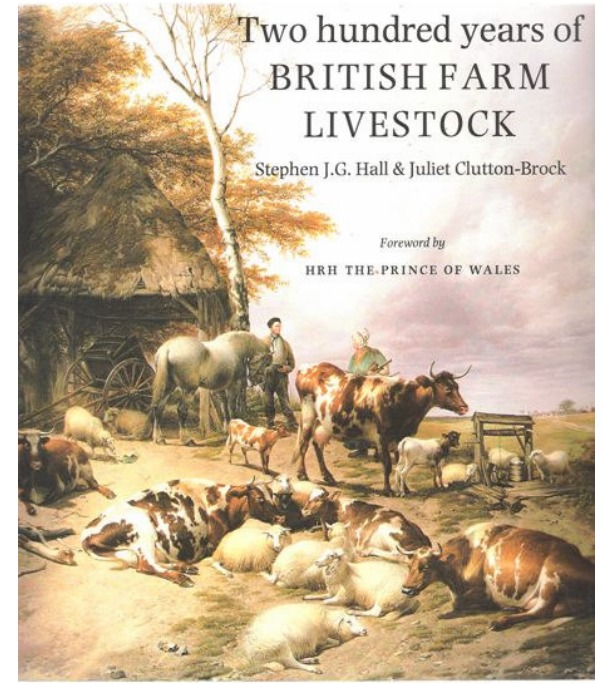
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Hall, S.J.G., Clutton-Brock, J. (1988). Two hundred years of British farm livestock. British Museum (Natural History), London

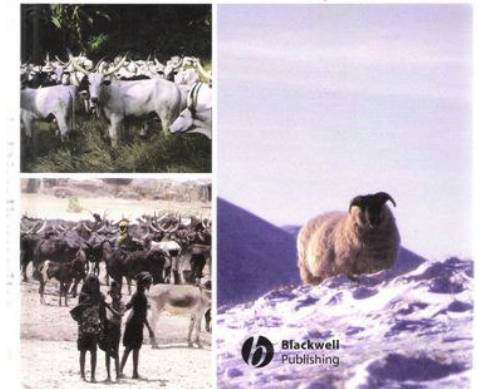
Hall, S.J.G. (2004). Livestock Biodiversity. Blackwell Publishing, Oxford



Livestock Biodiversity

Genetic Resources for the Farming of the Future

STEPHEN J. G. HALL

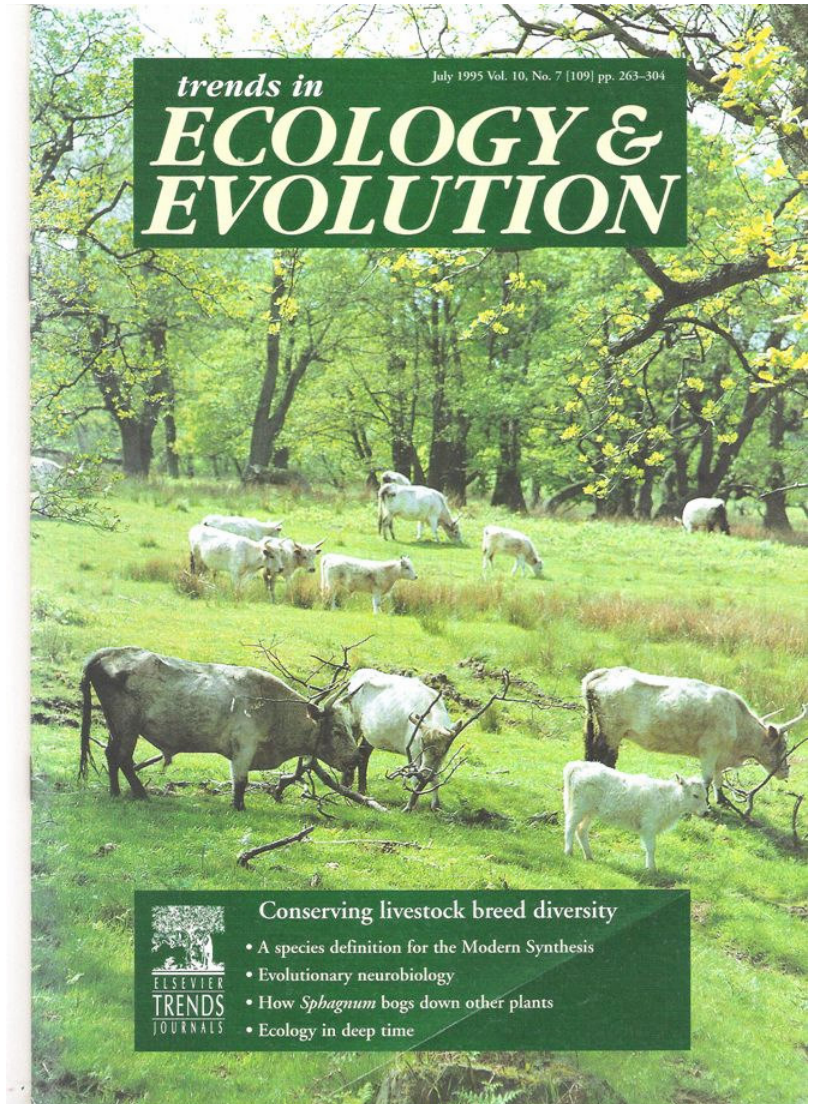


Personal research interests

Livestock breeds in general in UK and Africa, with particular interest in the Chillingham cattle (northern England)

www.chillinghamwildcattle.com

- Currently Vice Chairman of Chillingham Wild Cattle Association
- Co-opted member of Council of Rare Breeds Survival Trust 2003-2006



Please note that in this presentation and subsequent discussion, opinions expressed are those of SJGH and not necessarily those of Defra or any other individual or organisation

Some definitions

- Defra – Department of Environment, Food and Rural Affairs UK's government ministry of agriculture, food, fisheries, environment
- FMD = foot and mouth disease
- Scrapie – transmissible spongiform encephalopathy (TSE) of sheep
- RBST – Rare Breeds Survival Trust

Events

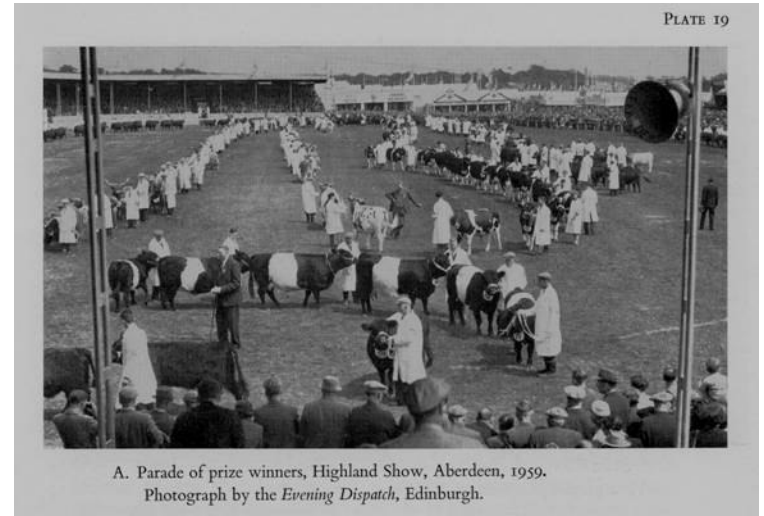
- Foot & Mouth disease 2001
2,026 confirmed cases, 4 million animals slaughtered at 10,000 farms
- Foot & Mouth disease 2007
- Avian Influenza
- Bluetongue virus
- EC Rural Development Regulation (modulation) – native breeds supplement

Percentage losses - FMD 2001

		Calculated/stated loss during FMD 2001	Breeding females 2002
Cattle	Belted Galloway	21%	1400
	Beef Shorthorn	12%	582
Sheep	Rough Fell	75%	12000
	Herdwick	40%	45000
	South Country Cheviot	34%	43000
	Hill Radnor	23%	1539
	Whitefaced Woodland	18%	656
	Wensleydale	12%	1624
Goats	Bagot	7%	80
	Golden Guernsey	2%	700
Pigs	Large Black	6%	377
	Gloucestershire Old Spot	4%	628



< Rough Fell



A. Parade of prize winners, Highland Show, Aberdeen, 1959.
Photograph by the *Evening Dispatch*, Edinburgh.

^ Belted Galloway



< Golden Guernsey

v Beef Shorthorn



^ S.C.
Cheviot

< W.F.
Woodland



Bagot



FMD 2001 revealed how some breeds may be quite strong numerically, but very localised (Sheep Trust maps)



Herdwick



S.C. Cheviot



S.Wales Mountain



Lonk

History of Defra National Standing Committee for Farm Animal Genetic Resources

- Defra's predecessor Ministry of Agriculture Fisheries and Food (MAFF) had held "meetings of interested parties" about farm animal genetic resources starting in 1995
- December 2001 – Consultative Committee set up to prepare UK submission to FAO "State of the World's Animal Genetic Resources"
- This led to a Defra National Steering Committee to prepare an Action Plan for Farm Animal Genetic Resources which was published in November 2006, and all its Recommendations were accepted by UK government & devolved administrations
- First recommendation was establishment of Defra National Standing Committee for Farm Animal Genetic Resources – first meeting March 2008
- <http://www.defra.gov.uk/farm/policy/geneticresources/index.htm>

Membership of NSC

Prof Geoff Simm (Chair)	Scottish Agricultural College	Ms Libby Henson	Grassroots Ltd.	Dr Richard Small	Liverpool John Moores Univ. (RBST Council)
Dr Santiago Avendano	Aviagen	Mr Julian Hosking	Natural England	Mr Mark Smith	Genus Breeding Ltd.
Mr Peter Baber	National Sheep Association	Prof Charlotte Maltin	Quality Meat Scotland	Mr Bryn Thomas	Welsh Assembly Government
Mr Marcus Bates	British Pig Association	Mr Roy Paterson	Scottish Government	Mr Chris Warkup	Genesis Faraday
Mr Richard Davis	First Milk project	Dr Tim Roughsedge	Scottish Agricultural College	Prof John Woolliams	Roslin Institute
Prof Stephen Hall	Univ. of Lincoln	Mr Andrew Sheppy	Cobthorn Trust (Poultry & RBST Council)	Mr Mike Roper Ms Caithriona Porter	Defra

National Action Plan – recommended actions (n=38)

<http://www.defra.gov.uk/farm/livestock/strategy/genetic-res/pdf/fangr-actionplan.pdf>

- a) A set of actions towards identifying & monitoring UK native breeds, their breed structures, and risks to their genetic composition. Includes recommendations for phenotypic and molecular-genetic characterisation.
- b) Recommended action no. 13 – seeks to define “a breeding nucleus essential to the survival of the breed” and to identify “breeds at risk as a result of geographical concentration”.

Recommended actions *continued*

- c) A set of actions in relation to prioritisation of breeds for conservation, including definition of “thresholds for geographical concentration, local adaptation and breed distinctiveness”.
- d) A set of actions in relation to complementary policy objectives including applications of breeds in sustainable systems, and including communications and publicity, education and specialist training

Recommended actions *continued*

- e) Actions in relation to animal health – monitoring impact of National Scrapie Plan, contributing to development of livestock disease control policies, welfare codes (in relation to breeding technologies and programmes)

Recommended actions *continued*

- f) Food & mouth disease – Recommended Action 32 says “... the NSC should advise Government on a scientifically and legally robust definition of a nucleus unit essential to the survival of the breed, with or without cryopreserved genetic material as a backup, particularly where that breed is not numerically rare but is geographically concentrated”

Recommended actions *continued*

- g) Actions required in relation to Recommended Action no. 33: “When the new EU Avian Influenza Directive is implemented in the UK, the special provisions to protect rare poultry breeds should be transposed into UK legislation. This will require an improved data set on UK poultry breeding holdings ...”

Some current issues

1. Priority lists, nucleus flocks/herds, geographical concentration
2. Breeds At Risk Register
3. National Scrapie Plan Sheep semen Archive
4. Bluetongue virus (BTV)
5. Agri-environment schemes and native breeds

RBST thresholds (breeding females)

(numbers of breeds in each category)

Category	Cattle	Horses & Ponies	Pigs	Poultry	Sheep	Goats
1. Critical	<150 4	<300 3	<100 0	<100 17	<300 1	<100 0
2. Endangered	150-250 2	300-500 3	100-200 2	100-200 6	300-500 2	100-200 1
3. Vulnerable	250-450 1	500-900 3	200-300 4	200-300 5	500-900 4	200-300 0
4. At risk	450-750 2	900-1500 3	300-500 1	300-500 4	900-1500 10	300-500 0
5. Minority	750-1500 3	1500-3000 0	500-1000 1	500-1000 0	1500-3000 5	500-1000 5

Sheep Trust priority list

	Geogr. isolation	Env. adaptation	Genetic distinctiveness	Breed score	Census
Herdwick	8	8	8	24	45000
Shetland	6	6	6	18	2500
Rough Fell	6	6	5	17	12000
Lonk	4	6	5	15	3500
Welsh Hill Speckled	5	4	4	13	?
Nelson (S. Wales Mtn.)	5	4	4	13	?
Romney	4	5	4	13	?
Dalesbred	4	4	3	11	37500
Exmoor Horn	4	4	3	11	20000
Devon Closewool	6	2	2	10	4340
South Country Cheviot	4	2	3	9	43000
Brecknock Hill Cheviot	3	4	2	9	?
North Country Cheviot	1	4	3	8	86000

National Scrapie Plan sheep semen archive

- 544,600 straws from 1,460 rams from 73 breeds, stored at 3 sites
- Established at cost of £3.5 million by Government
- Set up to encourage sheep breeders to participate in NSP Ram Genotyping Scheme which aimed to reduce incidence of scrapie-susceptible genes
- Rams represented had (mainstream breeds) at least one of the 4 susceptible alleles or (non-mainstream breeds) the VRQ allele
- The concern was that the susceptible alleles might be linked with some important characteristic
- Now evident that there isn't such a linkage and that the risk of BSE in sheep is trivial
- Ram Genotyping Scheme to be closed. Semen Archive to be taken over by RBST and sheep industry (National Sheep Association)
- Archive to be reduced in size – some breeds/rams to be discarded and some semen will be available for research – **anyone interested?**

RBST Semen Collection

	Breeds	Animals	Straws
Cattle	31	615	98,218
Sheep & goats	29 & 2	275	29,650
Horses & ponies	12	33	2,159

(Some embryos of Gloucester cattle are also stored)

Bluetongue – situation at 10 December 2008

- BTV-8, 148 confirmed premises affected in England & Wales to date
- No circulating BT disease in UK in 2008
- 10 cases of BTV-8 infected imports
- Vaccination against BTV-8 in England & Wales is voluntary. 80-90% uptake in SE & E of England, lower elsewhere. Overall enough vaccine has been sold to vaccinate 60% of susceptible population
- Keepers of rare breeds in England have been advised to vaccinate
- Vaccination against BTV-8 in Scotland is compulsory
- <http://www.defra.gov.uk/animalh/diseases/notifiable/bluetongue/index.htm>

Disease threats in general

Defra has a team continually assessing disease threats to UK livestock –

<http://www.defra.gov.uk/animalh/diseases/monitoring/index.htm>

Breeds At Risk Register

- FMD Directive 2003/85/EC provides for special measures for the protection of **breeds at risk** through the protection of nucleus populations identified ahead of the epidemic
- In the event of an outbreak – if responsible officer is required to cull a flock/herd that appears in the official register the officer may at his/her discretion place the nucleus in a strict quarantine rather than cull it
- A standardised list of breeds at risk is agreed for FMD but several other lists also exist for other purposes

Condensed from paper by JW

Breeds At Risk Register

- Funded by Defra, managed by RBST, subcontracted to Grassroots Ltd.
- Extension of register to cover other diseases being discussed
- Methods of assessing degree of risk under discussion (maybe include measure of inbreeding)

Defra NSC current invitation to tender for R&D funding

- Molecular characterisation
- Breeding goals for low emissions
- Definition of nucleus herds & geographical concentration

Agri-environment schemes

- Higher Level Stewardship – competitive, payments for environmental services
- By December 2008, 228 agreements covering 10,000 hectares have been set up under the Farm Animal Genetic resources supplementary measures
- £6 million to be spent on supporting native breeds in environmental management in England over 10 years

Conclusion

- Government resources for farm animal genetic resource conservation are very limited
- Opportunities are being taken to capitalise on other initiatives (agri-environment, UK commitments under Convention on Biodiversity) to promote native breeds
- Defra working in partnership with NGOs and livestock charities when possible