

BRITISH EXPERIENCE OF A.I. AND ITS USE IN THE CONSERVATION
OF RARE PIG BREEDS

J. R. Walters and P. N. Hooper
Masterbreeders (Livestock Development) Ltd.
Hastoe, Tring, Herts. HP23 6PJ. UK.

SUMMARY

There are seven endangered pig breeds in Britain being conserved by a semen freezing programme financed by the Rare Breeds Survival Trust. To date, 22 boars have been frozen with satisfactory semen parameters. Wherever possible fresh semen is also made available to breeders and data from 14 boars suggest similar semen parameters to the main white breeds. However significant numbers of rare breed boars show low libido. On average, Prostaglandin F_{2α} is used twice as often in rare breeds. On limited observations, the Berkshire and Large Black breeds appear most affected.

INTRODUCTION

In Great Britain endangered pig breeds are maintained mostly in small groups (maximum of 2 boars and 15 females) on a variety of farms. The major problem with this is the avoidance of inbreeding and genetic drift. Smith (1984) and Maijala et al (1984) have outlined the suitability of rotational systems of breeding to minimise inbreeding as long as numbers are adequate. However, of the seven British breeds listed with the Rare Breeds Survival Trust (RBST), six are category one (critical) and only one - Gloucester Old Spot - category two (rare). Although there has been an increase in litter notifications and herd book registrations in most breeds over the past five years, there remains concern over the future of the breeds, particularly as in some breeds more than 50% of litters are cross-bred. In an attempt to overcome this situation the RBST is offering financial incentives to breeders and subsidising a programme of semen collections to facilitate long-term shortage.

MATERIALS AND METHODS

The RBST programme either leases or purchases boars from particularly endangered lines and transports them to the Masterbreeders A.I. Station at Royston, Hertfordshire for collection and long-term storage. The aim is to collect 10 boars each year. Maijala et al (1984) advised storage from at least 25 unrelated sires per breed so the programme is expected to continue for several years.

After compulsory isolation, boars are trained to the dummy and collected routinely prior to freezing. Any boars exhibiting temporary loss of libido are treated with Prostaglandin F_{2α} (Hooper, Gray, Goodman and Walters, 1984). All semen collections employ an adaptation of the basic glove-hand technique. Particular emphasis is placed on the reduction of preputial contaminants and only the sperm-rich fraction is collected. Concentration, motility and abnormalities are assessed as a routine and only collections having a bulk sperm-rich density of 10⁹ sperm per ml are used for freezing. Semen is frozen in pellet form in Beltsville freezing diluent (BF5) and thawed in Beltsville thawing solution (BTS) for evaluation.

RESULTS

To date, 22 boars representing all rare breeds have had semen frozen in 35 separate sessions (see Table 1).

Table 1: Summary of Rare Breeds Semen Freezing Sessions

	<u>SEMEN DATA</u>				
	Number Boars	Number Sessions	Density*	Volume	Number Tubes
Berkshire	4	7	10.98	49	10
British Saddleback	7	9	12.96	56	11
Gloucester Old Spot	1	2	10.60	56	11
Large Black	2	3	15.40	64	11
Middle White	5	10	12.19	63	11
Tamworth	2	2	9.20	56	11
British Lop	1	2	11.89	58	11

* Sperm concentration ($\times 10^8$ per ml).

With the exception of one Large Black boar with an unusually high density there were no significant differences between boars or breeds. Indeed these semen data were very similar to data for Large White and Landrace boars. Motility was excellent or very good. However, one Saddleback boar had suspect freezability.

Boar candidates for freezing remain in the stud for a limited period - however, fresh semen is made available to breeders wherever possible. Semen collection data are now available on 14 rare breed boars collected routinely for a minimum of 6 weeks since 1.1.87 (see Table 2).

Table 2: Rare Breed Fresh Semen Data

	Number Boars	Density*	Volume	Doses ⁺
Berkshire	2	9.41	77	22.5
British Saddleback	3	10.51	83	29.7
Gloucester Old Spot	1	9.56	89	27.0
Large Black	1	9.00	99	29.6
Middle White	4	10.23	82	26.2
Tamworth	2	8.96	71	20.9
British Lop	1	10.76	79	28.2

* Sperm concentration ($\times 10^8$ per ml).

⁺ Corrected to seven day collection period.

On the limited number of observations there was some variation in performance but this is very typical of fresh semen production data on small boar numbers.

In Table 3 the pooled data for the rare breeds is compared with the mean for the 2 main breeds in the stud, Large White and Landrace, collected over the same period.

Table 3: Breed Comparison

<u>Breed</u>	<u>Density</u>	<u>Volume</u>	<u>Corrected Doses</u>
Large White	10.17	92	30.2
Landrace	9.10	109	33.0
Rare Breeds	9.89	81	26.1

There were no significant differences between the 'breeds'. However, one area where there would appear to be differences is in libido. Subjective assessments suggest that significant numbers of rare breed boars are slow to mount the dummy and have problems maintaining an erection. On average, Prostaglandin F2 α is used twice as often in rare breeds compared to other breeds. On limited observations, the Berkshire and Large Black breeds appear particularly affected.

DISCUSSION

Any discussion on the use of frozen semen stocks must note that they are making no genetic progress with time - thus differences will accumulate making it progressively more difficult to compete. However, this assumes satisfactory selection and on-going genetic progress in future live populations. One possible criticism of rare breed conservation is that animals are conserved 'regardless' of performance and breed type. Sometimes the problem is confounded by the selection of specific 'Bloodlines' on the basis of name alone. Because male offspring take the name of their sire, and females that of their dam, it is possible that the bloodline name of an animal has little relation to the concentration of genes from specific ancestors. Thus, to choose an animal for breeding purely on the basis of the name of its bloodline is to make a choice on inadequate information. Hall (1988) suggests that the best course of action is to look at the pedigrees of the offspring that would result from proposed matings and only proceed if the resulting inbreeding will be low. This is applicable to both natural mating and A.I.

In conclusion, A.I. appears to have a vital role in the conservation of genetic resources in pig breeds. In the UK an on-going programme of freezing semen is now underway as well as the supply of fresh semen thus supporting the survival long-term of the British rare breeds.

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