

## Outline of the present UK situation with artificial insemination in pigs

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**Summary** — Pig AI was first introduced as a practical proposition in the mid-1950s. Since then its development in the UK has demonstrated a response to trends in the industry. At the outset AI was used in nucleus herds where it allowed access to top quality genetic material and reduced the health risks associated with the introduction of new bloodlines. At this early stage fertility was low and semen storage technology in its infancy. The early pioneers recognized the value of AI, however, and worked towards solving the practical problems with which they were presented. In the years that followed much was learnt about semen processing and storage and the insemination techniques. The Melrose rubber spiral insemination catheter was developed at Reading Cattle Breeding Centre in 1961. Ministry of Agriculture licensing regulations were introduced in 1964 governing the movement of boar semen, the health status of the boars and stud management. In 1966 the PIDA (Pig Industry Development Authority) Combined Test Scheme ensured the provision of performance tested boars to AI centres. During the 1980s the face of AI began to change. From its original role as a means to genetic improvement it became more important on commercial units, where fertility is at a premium. From a slow beginning the growth of AI began to accelerate. For the year ended September 1990, semen sales from the commercial AI centres accounted for approximately 11% of sow services in the UK. In addition, a number of the major breeding companies are now using AI to enhance genetic programmes. It is now used at all levels of production:

- nucleus herds: AI enhances genetic programmes with minimal risk to health status;
- multiplication units: AI allows rapid widespread dissemination of top quality stock across the multiplication level of production.
- commercial herds: accounting for approximately 85% of AI usage, commercial herds can enjoy an improvement in both the performance and quality of slaughter pigs. In addition, AI is utilized as an aid to boar management;
- exports: AI facilitates the international exchange of genetic material, by reducing the cost and simplifying procedures. As we progress through the 1990s, AI is poised to be of maximum service to the UK pig industry.

### artificial insemination / pig / genetic progress

**Résumé** — **Aperçu de la situation actuelle de l'insémination artificielle porcine au Royaume Uni.** L'IA porcine a été introduite pour la première fois comme proposition pratique au milieu des années 1950. Depuis lors, au Royaume Uni l'IA s'est développée en réponse aux tendances de la profession. Au début, l'IA était utilisée dans les troupeaux de sélection où elle permettait l'accès au meilleur matériel génétique et réduisait les risques sanitaires associés à l'introduction de nouvelles lignées. À cette période la fertilité était faible et la technologie de conservation de la semence en

était à ses débuts. Les premiers «pionniers» reconnaissaient toutefois la valeur de l'IA et travaillaient à la résolution des problèmes pratiques lorsqu'ils se présentaient. Dans les années qui suivirent beaucoup de connaissances furent amassées sur le conditionnement et la conservation de la semence et sur les techniques d'IA. Le catheter d'insémination spiralé en caoutchouc «de Melrose» a été mis au point au centre d'élevage bovin de Reading en 1961. Les règlements du ministère de l'Agriculture furent introduits en 1964 pour organiser les mouvements de semence de verrat, leur statut sanitaire et la gestion des livres généalogiques. En 1966, la PIDA (Pig Industry Development Authority) mit au point les schémas de testage permettant l'approvisionnement des centres d'IA en verrats testés. Au cours des années 1980, la physiologie de l'IA commença à changer. De son rôle d'origine d'amélioration génétique, elle commença à devenir importante dans les élevages de production, où une bonne fertilité est très recherchée. Après un démarrage assez lent, le développement de l'IA s'est accéléré. Pour l'année qui précède septembre 1990, les ventes de semence par les centres d'IA ont représenté approximativement 11% des truies mises à la reproduction dans le Royaume Uni. De plus, un certain nombre de grandes compagnies génétiques utilisent maintenant l'IA dans les programmes d'amélioration génétique. Elle est maintenant utilisée au niveau de la production:

- dans les troupeaux de sélection, l'IA améliore les schémas de sélection avec un risque sanitaire minimal;
- dans les troupeaux multiplicateurs, l'IA permet une diffusion large et rapide des gènes de haute qualité au niveau des multiplicateurs;
- dans les troupeaux commerciaux, responsables d'environ 85% de l'utilisation de l'IA, les troupeaux commerciaux apprécient l'accroissement des performances et de la qualité des porcs abattus. De plus, l'IA est utilisée comme une aide pour la gestion des verrats.;
- à l'exportation, l'IA facilite l'échange de matériel génétique, en réduisant les coûts et en simplifiant les procédures. Puisque nous progresserons encore dans les années 1990, l'IA rendra encore service à la production porcine au Royaume Uni.

### **insémination artificielle / porcin / progrès génétique**

## **HISTORY**

In 1956, Doctor Chris Polge presented a paper entitled "Artificial insemination in pigs". It described work conducted during the 1930s on the state farms in Russia in which techniques for semen collection, processing and insemination had been devised. Despite this early progress, little or no commercial development of AI had followed. Polge pointed out the benefits of this system of breeding which could allow all producers, regardless of herd size, access to top quality boars.

During the 1950s 4 cattle AI centres had established AI services for pigs which provided local farms with an inseminator service. Initially fertility results were poor but these early pioneers recognised the potential value of AI and worked towards solving the practical problems which arose. In the

years that followed there was much progress in AI technology. The Melrose rubber spiral catheter was developed at Reading Cattle and Pig Breeding Centre in 1961. Ministry of Agriculture licensing regulations were introduced in 1964, governing the movement of boar semen, the health status of AI boars and stud management. In 1966 the PIDA (Pig Industry Development Authority) Combined Test Scheme established a system for selecting outstanding sires.

During the 1980s the face of AI began to change. From its original role as a means to genetic improvement on nucleus herds it became of importance on commercial units. At this level of production fertility is at a premium – AI could only expand into this area when fertility could equal that achieved by natural service. From a slow start the uptake of AI was beginning to accelerate.

## THE CURRENT SITUATION

AI usage in the UK has increased steadily over the past few years (fig 1). Semen sales from centres offering a public service accounted for  $\approx 11\%$  of sow services for the year ended September 1990. In addition, a number of the major breeding companies are now operating AI studs in order to enhance genetic improvement (see fig 2 – the distribution of AI centres). Some larger pig units have embarked on a programme of “on-farm AI” which involves semen collection, processing and insemination on the farm. Although difficult to assess the amount of “on-farm AI” in use, it is likely to account for at least 10 000 sow services a year and interest continues to grow. Training for farms wishing to establish their own “in-house” AI stud is best provided by a licensed AI centre.

Despite the marked interest in uptake, the UK still lags behind many of its European partners in exploiting the benefits of pig AI. Producers are beginning to recognise, however, that AI has a number of valuable roles to play at the various levels of pig production:

### *Nucleus herds*

The breeding companies and independent breeders alike are using AI as an integral

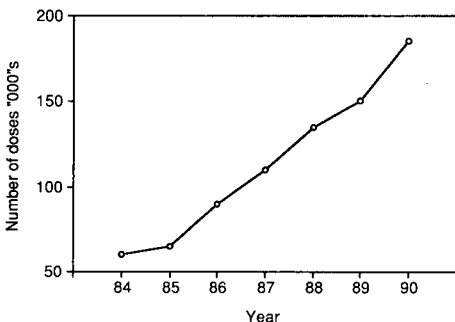


Fig 1. AI usage in the UK.

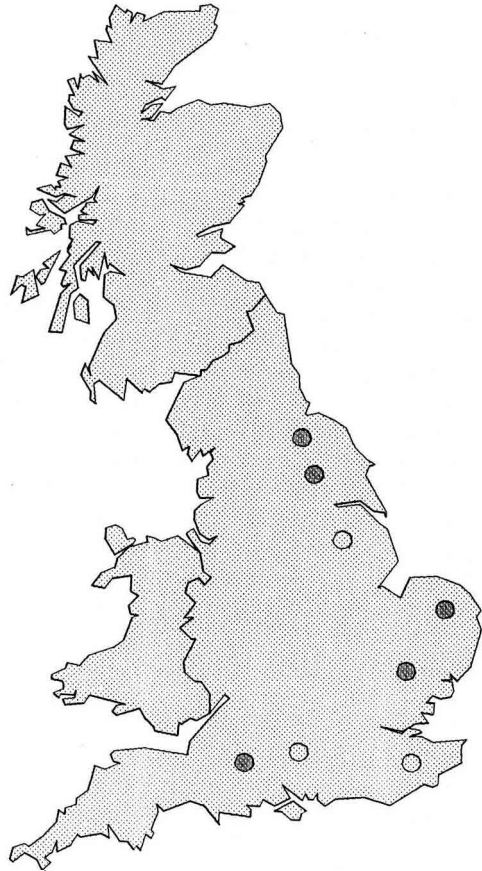


Fig 2. Distribution of AI centres.

component of their programme for genetic improvement. It facilitates access to a wide range of top grandparent boars with minimal risk to health status. Sires from a number of populations may be compared directly on a “within herd” basis.

### *Multiplication units*

AI allows rapid widespread dissemination of quality stock across the multiplication

level of production, thus accelerating genetic progress.

### **Commercial herds**

The use of AI on commercial units now accounts for approximately 85% of semen sales. Using AI to breed slaughter pigs, both production efficiency and carcass quality may be enhanced. Strategic use of specific boars enables the producer to tailor the end product to meet the precise requirements of individual contracts. AI also offers the commercial producers the ultimate in flexible boar power - greatly simplifying boar management. Outdoor units are now using AI as a means to overcome some of the problems with seasonal infertility.

### **Exports**

AI facilitates the international exchange of genetic material - semen exports in both fresh and frozen form reduce the cost and improve the practicability of this procedure.

When AI was first introduced it was classically applied as a double dose of semen (two bottles) from one boar into a sow at one oestrus period - this is described as "pure AI". Various other combinations are now in use which appear to enhance fertility: 1) pure AI (described above); 2) 1st insemination with semen from boar 1; 2nd insemination with semen from boar 2 (similar to cross-serving a sow with natural service). 3) (a) AI followed by natural service; (b) Natural service followed by AI; 4) pooled semen - the sow is inseminated with semen from 2 or more boars of the same breed, mixed together.

In order to evaluate an improvement in fertility afforded by any of these combinations, a within-herd contemporary comparison

would be necessary. Unfortunately, such data are difficult to obtain in numbers large enough to demonstrate a statistically significant difference. In a study of unselected field data however, Hooper *et al* (1986) observed some differences in fertility resulting from the various treatments (table I).

**Table I.** Fertility with different AI combinations (Hooper *et al*, 1986).

	Control pure AI	AI boar 1 + AI boar 2	AI + NS	NS + AI
No of sows	5 194	634	974	386
Farrowing rate (%)	85.2	88.0	93.1	89.3
Average litter size	10.7	11.4	11.0	11.2

### **CONCLUSION**

When Chris Polge presented his paper in 1956 he concluded "The present position of AI in pigs holds out at least as much promise as did AI in cattle 15 years ago". The great man was right! The development of AI in pigs has been, perhaps, slightly more protracted than originally anticipated but it is now poised to be of maximum service to the UK pig industry.

### **RÉFÉRENCES**

- Hooper PN, Green CG, Walters JR (1986) Aspects of commercial pig AI fertility levels. *Proc 9th IPVS Cong Barcelona*, 39 p
- Polge C (1956) Artificial insemination in pigs. *Vet Rec* 68, 62-76