IMPROVING MANAGEMENT FOR THE BENEFIT OF PEOPLE
AND PIGS - SYNCHRONISED FARROWING IN THE PIG

M. Wähner, U. Hühn

Abstract: The induction of farrowing within a reproductive management framework
already plays a considerable routine role in the husbandry of the sow herd. This issue
increases the awareness of the effects that the various chosen farrowing synchronising
injections and treatment programmes have in parturient sows and piglets.

The application of biotechnologically derived methods to synchronise the
commencement of the birth process and the management of farrowing can be traced
back to the 1970’s. Following the availability of Prostaglandin F2α various treatment
programs for synchronising farrowings were developed.

The injection to induce farrowing must not be given prior to the 114th day of
gestation, in order to ensure minimal risk of affecting the final and important growth
surge of the foetuses. The combination of PGF₂α with a long acting Oxytocin
(Hypophysin®) allows for a further reduction in the individual variation in the
commencement of farrowing and reduces the duration of farrowing for each parturient
sow. The synchronisation eases the observation, recording and husbandry tasks required
for the sow and neo-natal piglets, facilitates an effective cross fostering system and
where problematic, reduces the frequency of dystocias and MMA type disorders.

Key words: sow, synchronised farrowing, PGF₂α, Hypophysin®

Introduction

Pig prices have experienced considerable pressure on the international market.
Whoever wishes to compete successfully in this increasingly tough competitive market
strives for the necessary improvements in performance, whilst at the same time
maintaining economic costs and investment levels. In breeding herds the minimum
annual production target is now more than 21 piglets reared per sow per year, starting
from their first mating. The market continues to demand large groups of quality weaners
of a suitable genetic base, even weight and age and having a defined health status. These
developing market tendencies support the increasing use of A.I. and lead the breeding
herd manager towards the introduction of batch farrowing systems (batch weaning with
set time interval farrowing cycles). This batch farrowing production system is integral
with the all-in all-out principle and is effectively a positive and primary part of the
quality control of animal health in successful business and breeding herd management
(Iben, 1997).

1 Original scientific paper – Izvorni naučni rad
2 Prof. Dr. Martin Wähner, Anhalt University of Applied Sciences, Bernburg, Germany; U. Hühn.
Veyx-Pharma GmbH, Schwarzenborn, Germany
The spread of farrowings within the synchronised group of sows should be as low as possible. Further, the duration of parturition in the sows should also be short. The natural spread of farrowings confounds this, with a mean of 115 days but a spread from below 111 to over 120 days (fig 1.). Larger litters on average have a shorter gestation period compared to the smaller litters. In PRRS infected herds late abortions can manifest themselves. The infection with porcine parvovirus leads to unwanted extensions. Iodine deficiencies in the gestation diet and amongst others high rape extractive content leads to the same effect. Experienced animal nutritionists recommend its total exclusion from sow feed mixes.

![Graph showing daily farrowing distribution](image_url)

*Figure 1. Distribution of gestation length (sows and gilts)*  
*Slika 1. Raspored dužine gestacije (krmače i nazimice)*

- Partial synchronisation of farrowing

The use of effective prostaglandins of the type F2α (PGF2α) allows the practical induction of farrowing based on the physiological time scale. The synchronised induction of parturition in sows due to farrow prevents the unwanted extension of gestations beyond 116 days. The practical inclusion of this reproductive management tool allows for “farrowing free” weekends or weekdays to be planned for. This advantage should not, however, be bought at the cost of losing piglet vitality and birth weight through inducing farrowing too early, that is a concern when using PGF2α to initiate the birth process. This is related to the prenatal growth of the piglet, which reaches 80 to 100g per day in the final gestation period (Währer 1999).
It has been determined that there is little or no further piglet growth in the uterus after the 115th day of a natural gestation period (Wähner and Hühn, 1999). It is a fact that inducing farrowing too early is related to a negative effect on the survival and post-natal development of the piglet (table 1).

This has led to the advice for a partial synchronisation of farrowing. With this technique spontaneous farrowings occurring up to the 114th day are observed and treated in the standard way. Only those sows that have not yet farrowed are artificially induced. This procedure facilitates the completion of the growth and maturity of the piglet just prior to farrowing, along with avoiding any negative effects on the piglet’s birth weight and subsequent growth rate during the suckling period.

Table 1. Negative influence of inducing birth too early on the subsequent weight development of the piglet
Tabela 1. Negativan uticaj indukcije prerano prasenja na kasniji porast telesne mase prasadi

<table>
<thead>
<tr>
<th>Induction/Indukcija</th>
<th>No.of litters/Br. legala</th>
<th>Liveborn piglets/br. živorodene prasadi</th>
<th>Mean weight of piglets at birth (kg)/Srednja težina prasadi na rođenju (kg)</th>
<th>Growth to 18th day/Rast do 18. dana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural/spontaneous Prirodni/spontani</td>
<td>110</td>
<td>11.2</td>
<td>1.47</td>
<td>4.09</td>
</tr>
<tr>
<td>Cloprostenol 113th day</td>
<td>10</td>
<td>11.0</td>
<td>1.40</td>
<td>3.84</td>
</tr>
<tr>
<td>Cloprostenol 114th day</td>
<td>159</td>
<td>11.2</td>
<td>1.52</td>
<td>4.07</td>
</tr>
<tr>
<td>Cloprostenol 115th day</td>
<td>105</td>
<td>11.1</td>
<td>1.47</td>
<td>4.23</td>
</tr>
</tbody>
</table>

- Fixing the suitable timing for injection

There are a good number of practical tips and product advice notes recommending the synchronisation of farrowing from the 111th day of gestation. These frequently have inaccurate details on how to calculate the exact day of gestation. Some pharmaceutical companies use the base line that day 0 is the first day of heat (new advertising literature illustrates this very well).

Unfortunately, they refer to heat when they really mean oestrus. In practical circles the vernacular often leads to us forgetting that heat has three phases: pre-oestrus, oestrus and pro-oestrus. It appears to us, that using the beginning of heat is an unsuitable method of estimating gestation length.

A better method is the use of the service date that resulted in the gestation. In practice the most secure date for injection is the 114th day of gestation and the following (table 2.) estimation has produced good and reliable practical results:
Table 2. Weekday of service/insemination of the sow and the corresponding day of gestation for a "cyclo-gramme" controlled piglet production procedure

<table>
<thead>
<tr>
<th>Weekday of the 1\textsuperscript{st} &amp; 2\textsuperscript{nd} insemination/ Dan 1. i 2. inseminacije</th>
<th>Day of the week the gestation days fall upon/ Dan u nedelji na koji pada gestacija</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon/Tue – Pon/Uto</td>
<td>Tue/Uto</td>
</tr>
<tr>
<td>Tue/Wed – Uto/Sre</td>
<td>Wed/Sre</td>
</tr>
<tr>
<td>Wed/Thu – Sre/Cet</td>
<td>Thu/Cet</td>
</tr>
<tr>
<td>Thu/Fri – Čet/Pet</td>
<td>Fri/Pet</td>
</tr>
<tr>
<td>Fri/Sat – Pet/Sub</td>
<td>Sat/Sub</td>
</tr>
</tbody>
</table>

Comprehensive field studies in large herds demonstrate that injection timing prior to the 114\textsuperscript{th} day of gestation reduces the number of sows that farrow within the desired time scale of up to 36 hours post injection. This parameter is also termed the partus rate\textsubscript{36} (PR\textsubscript{36}). The PR\textsubscript{36} level is related to the product applied, the dosage rate and the injection timing. The nearer we are to the natural point of parturition the better the PR\textsubscript{36}. Synthetic analogues of natural PGF\textsubscript{2\alpha} are more effective than those containing the active ingredient Dinoprost. The reference to commercial product names and their chemical make-up is neither intended as a recommendation nor a criticism of similar products not mentioned. Table 3 illustrates the distribution pattern for farrowings following the application of various products (Dreschel et al., 1999). There was a proportion of "non-reactors" in trial groups. These "late farrowers" can occur even with late treatments (115/116\textsuperscript{th} day of gestation). Combination synchronisation programmes offer an advantageous way out in combating this problem.

Table 3. Commencement of farrowing in groups of sows following induction procedures (Dreschel et al., 1999)

<table>
<thead>
<tr>
<th>Product</th>
<th>Dose</th>
<th>Injection Day</th>
<th>No. Sows</th>
<th>Partus rates</th>
<th>Birth hours post injection (av.hours)</th>
<th>%NR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proizvod</td>
<td>Doza</td>
<td>Injekcija/ dan</td>
<td>Br. krmača</td>
<td>Pr a s e nje</td>
<td>Prasenje nakon injekcije</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
<td>---------------</td>
<td>----------</td>
<td>--------------</td>
<td>--------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Glandin</td>
<td>2 ml</td>
<td>113</td>
<td>139</td>
<td>45.3</td>
<td>90.6</td>
<td>92.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dinolytic</td>
<td>2 ml</td>
<td>114</td>
<td>966</td>
<td>60.5</td>
<td>91.4</td>
<td>93.6</td>
</tr>
<tr>
<td>Iliren</td>
<td>2 ml</td>
<td>114</td>
<td>949</td>
<td>44.2</td>
<td>89.5</td>
<td>94.1</td>
</tr>
<tr>
<td>Oestrophan</td>
<td>2 ml</td>
<td>114</td>
<td>1200</td>
<td>60.6</td>
<td>97.6</td>
<td>99.3</td>
</tr>
<tr>
<td>Cloprostenol</td>
<td>1 ml</td>
<td>114</td>
<td>2193</td>
<td>57.1</td>
<td>96.3</td>
<td>97.9</td>
</tr>
<tr>
<td></td>
<td>1 ml</td>
<td>113</td>
<td>1049</td>
<td>40.0</td>
<td>87.9</td>
<td>92.3</td>
</tr>
<tr>
<td></td>
<td>2 ml</td>
<td>113</td>
<td>1070</td>
<td>41.2</td>
<td>90.8</td>
<td>94.5</td>
</tr>
<tr>
<td></td>
<td>2 ml</td>
<td>114</td>
<td>980</td>
<td>60.8</td>
<td>93.2</td>
<td>96.9</td>
</tr>
<tr>
<td>Cloprostenol</td>
<td>1 ml*</td>
<td>113</td>
<td>476</td>
<td>46.8</td>
<td>85.9</td>
<td>92.3</td>
</tr>
</tbody>
</table>

* vulvo-submucous

% NR = % no response to induction / bez reakcije na indukciju
- The combination treatment program

Initially, sows that had not farrowed within 24 hours of the PGF$_{20}$ injection were given oxytocin. This procedure brought a series of disadvantages at the dosage levels necessary to bring on the birth process, e.g. increased need for manual assistance and afterbirth complications. The synchronisation effect was also not satisfactory. In this respect, superior results have been achieved following the availability of long-acting oxytocins based on the active ingredient Carbetocin. In a field study birth was induced with Cloprostenol (175 pg/animal). Sows in one group (n = 263) were given Hypophysin® (Carbetocin) intramuscularly 30 hours following the Cloprostenol. The other group (n = 212) served as control animals. The synchronisation concentration effects on farrowing of Depotoxytocin is clear from figure 2. The birth synchronisation treatment described allows the achieving of a series of positive effects. This biotechnological procedure supports the effective supervision of farrowing, reduces the risk of piglets born dead, neonatal losses and weak piglets, eases the routine treatment of the neonatal piglets and farrowing sows, as well as fostering and helps together with other measures, in achieving an undisturbed parturition (Hühn and Wähner, 1999).

Table 4. Influence of induced farrowing in multiparous sows with varying weights on the duration of the farrowing process

| Table 4. Uticaj indukovanog prašenja kod krovlja različitih telesnih masa na trajanje procesa prašenja |
|---|---|---|---|---|
| Induction method | Weight (kg) | No. | Duration (hrs) | per piglet (min) |
| Metod indukcije | Telesna masa (kg) | Br. | Trajanje (sati) (sred.) | po prasetu (min) |
| Spontaneous | < 240 | 8 | 192 | 80 | 15.0 |
| | 240 - 270 | 17 | 191 | 103 | 15.0 |
| | > 270 | 19 | 281 | 169 | 21.1 |
| Cloprostenol | < 240 | 17 | 237 | 99 | 18.8 |
| ≥ 114th day. | 240 - 270 | 34 | 166 | 65 | 13.3 |
| | > 270 | 27 | 212 | 89 | 16.3 |
| Cloprostenol | < 240 | 24 | 137 | 63 | 11.1 |
| 24 hours later | 240 - 270 | 27 | 142 | 73 | 11.4 |
| Hypophysin | > 270 | 35 | 130 | 67 | 10.8 |

The reduction in the duration of farrowing following the application of Hypophysin® is of particular significance (Hühn and Wähner 1999). In a field study on 208 (figure 3) multiparous German Landrace sows and weights at the point of farrowing, those treated with a PGF$_{20}$ (in this case: 0.17 mg Carbetocin) plus 1ml Hypophysin® combination had reduced time periods between the births of the piglets compared to the control sows that farrowed spontaneously or were induced using Cloprostenol only (Leike and Hühn 1992). The efficacy achieved in multiparous sows has also been confirmed in gilts and primiparous sows (Zaremba and Hühn 1999).
The stated dosage rates proved completely adequate and are to be recommended. In addition, it was found that the application of induced farrowing procedures over many years in herds practicing synchronised farrowing, led to a good level of herd health management connected to a reduction in the incidence of neonatal infections and farrowing fever cases (MMA); as illustrated in the following breeding herd in Saxony (table 5).

**Table 5. Long-term effects of synchronised farrowing using Cloprostenol on the proportion of sows exhibiting post parturient fever (PF) (MMA/farrowing fever)**

<table>
<thead>
<tr>
<th>Sow group</th>
<th>Sample based study</th>
<th>Istraživanje bazirano na uzorku</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grupa krmača</td>
<td>The year introduce</td>
<td>Početna godina</td>
</tr>
<tr>
<td></td>
<td>No. animals</td>
<td>PF affected</td>
</tr>
<tr>
<td>Spontaneous birth:</td>
<td>266</td>
<td>20.7%</td>
</tr>
<tr>
<td>Spontano prašenje</td>
<td>505</td>
<td>11.3%</td>
</tr>
<tr>
<td>Induced to farrow:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indukovano prašenje</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Efficacy achieved*:</td>
<td>-9.4%</td>
<td></td>
</tr>
<tr>
<td>Ostvarena efikasnost*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant (P<0.05) Sow breeding herd in RB Chemnitz, Germany
* Signifikantno (P<0.05) Odgajivački zapat krmača u RB Chemnitz-u, Nemačka
Figure 3. Relationship between synchronised insemination and synchronised farrowings (Leike and Hühn 1992)

Slika 3. Odnos između sinhronizovane inseminacije i sinhronizovanog prašenja (Leike and Hühn 1992)
Conclusions

Requirements for the successful inclusion of a synchronisation procedure within a herd’s management are:

- Reliable records of the insemination/natural service date; with induction close to the physiological point of farrowing
- Competent, controlled application of the tested and approved synchronisation products
- Appropriate herd planning and organisation in the breeding herd
- Recommended observation of farrowing, especially during the main farrowing period
- Sound targeted fostering to even up litter sizes

It is beneficial when the inseminations that resulted in the farrowings are also synchronised.

POBOLJŠANJE MENADŽMENTA U KORIST LJUDI I SVINJA
- SINHRONIZOVANO PRAŠENJE SVINJA

M. Wähner, U. Hühn

Rezime

Indukcija prašenja u okviru menadžmenta u reprodukciji ima veoma važnu ulogu, ali već rutinsku, ulogu u upravljanju zapatom krmača. Ovo pitanje povećava svest o uticaju različitih odabranih injekcija za sinhronizaciju prašenja i programa tretmana kod krmača pri prašenju i prasadi.

Primena biotehnoloških metoda radi sinhronizacije početka prašenja i upravljanje procesom prašenja datira iz 1970-tih godina. Nakon veće dostupnosti preparata Prostaglandin F<sub>2α</sub> razvijeni su različiti tretmani za sinhronizaciju prašenja.

Injekcija kojom se indukuje prašenje se ne sme davati pre 114. dana gestacije kako bi se osigurao minimalan rizik po dalji život fetusa. Kombinacija PGF<sub>2α</sub> i preparata Oxytocin (Hypophysin<sup>®</sup>) sa dugotrajnim dejstvom omogućava dalju redukciju individualnih varijacija u odnosu na pošetak prašenja i smanjuje trajanje prašenja za svaku krmaču koja se prasi. Sinhronizacija olakšava posmatranje, registrovanje i ostale zadatke vezane za krmaču i novorođenu prasad i smanjuje učestalost distocija i poremećaja tipa MMA.

Ključne reči: krmača, sinhronizovano prašenje, PGF<sub>2α</sub>, Hypophysin<sup>®</sup>
References


