



P.G. 600[®]

(Serum Gonadotropin and Chorionic Gonadotropin)

Technical Report 4

The Attainment of Estrus in Sows Administered with 400 I.U. Pregnant Mare Serum Gonadotropin and 200 I.U. Human Chorionic Gonadotropin at Weaning¹

Summary

A study was conducted to determine if hormone therapy consisting of a combination injection of 400 I.U. pregnant mare serum gonadotropin (PMSG) with 200 I.U. human chorionic gonadotropin (HCG) was effective in stimulating return to estrus in sows farrowing during the summer. The study was conducted on two Missouri swine farms.

Days-to-estrus was improved by seven days on Farm A but had no effect on Farm B. The number of sows exhibiting estrus within eight days postfarrowing was improved on Farm A but not on Farm B. The proportion of sows which farrowed and attained estrus was not altered by hormone therapy on either farm.

This study suggests that when return to estrus in weaned sows was delayed, hormone therapy of 400 I.U. of PMSG with 200 I.U. HCG was effective.

Introduction

For many swine producers, hot summer temperatures often cause delays in return to estrus for just-weaned sows. Sows not returning to estrus within seven days after farrowing cause decreases in efficiency of production and profit. To alter this, administration of hormones important in stimulating estrus may be effective.

Prepuberal gilts have exhibited fertile estrus when given 400 I.U. PMSG with 200 I.U. HCG (Paterson et. al., 1984). Therefore, a study utilizing two Missouri commercial swine farms was conducted to determine if administration of 400 I.U. PMSG with 200 I.U. HCG (P.G. 600[®]) was effective in improving return to estrus of sows that farrowed during the summer months.

Caution: Treatment will not induce estrus in gilts that have already reached puberty (begun to cycle). Gilts that are less than five and one-half months of age or that weigh less than 85 kg (187 lb.) may not be mature enough to continue normal estrus cycles or maintain a normal pregnancy to full term after treatment. Treatment will not induce estrus in sows that are returning to estrus normally three to seven days after weaning. Delayed return to estrus is most prevalent after the first litter; the effectiveness of P.G. 600 has not been established after later litters. Delayed return to estrus often occurs during periods of adverse environmental conditions, and sows mated under such conditions may farrow smaller than normal litters.

For complete safety information on P.G. 600 use, see accompanying product package insert.

Experimental Design

Two commercial swine farms were used in this study.

At Farm A, the experiment began the week of July 20, 1987 and included sows that weaned their litters prior to August 24, 1987. Sows weaned their litters at approximately three weeks after farrowing. There were 18 to 24 sows weaned weekly. A total of 80 sows were used for this project.

At Farm B, the experiment began the week of July 13, 1987 and included sows that weaned their litters prior to September 28, 1987. Farm B weaned sows at approximately four weeks of lactation. This farm weaned four to 10 sows weekly.

A total of 79 sows were included in the project. Sows scheduled to wean each week were randomly assigned to be injected with P.G. 600 (serum gonadotropin and chorionic gonadotropin) or to be untreated. Sows that received P.G. 600 were injected the day of weaning. Sows were checked daily for the onset of estrus with an intact boar. All sows were hand-mated.

Data collected provided information on the number of sows achieving estrus, days to estrus after weaning and number of sows reaching estrus eight days after weaning.

Results and Discussion

The number of sows that farrowed and exhibited estrus is given in Table 1. Treating sows with P.G. 600 did not stimulate more sows to come into heat. However, it appears that neither farm experienced a large number of sows becoming anestrous after weaning and therefore P.G. 600 would not be expected to be very effective under such circumstances.

Days to estrus after farrowing for those sows that exhibited estrus is reported in Table 2. For Farm A, the week the sows were weaned and treatment interacted to give a varied response. However, for the entire experiment, average days to first estrus for sows being injected with P.G. 600 was 7.2 days compared to 14.9 days for sows not being treated. No difference was detected among sows being treated with P.G. 600 when compared to untreated sows for days to first estrus at Farm B. The experiment was conducted for a longer period at Farm B than at Farm A.

The number of sows reaching estrus eight days after farrowing for each farm is given in Table 3. At Farm A, treatment of sows with P.G. 600 at weaning was effective in bringing more sows into estrus by day eight after farrowing. Treatment of sows with P.G. 600 at Farm B did not cause more sows to be in estrus by eight days after farrowing. The difference in the two farms could be due to reasons given in the previous paragraph.

Conclusion

Sows weaned at Farm A experienced a delay in return to estrus during the duration of this experiment. The administration of P.G. 600 was effective in decreasing the days to first estrus and provoking a larger number of sows to attain estrus within eight days after farrowing. Sows weaned at Farm B did not experience a delay in the return to estrus during this study. Therefore, P.G. 600 was not effective.

The data suggest that if return to estrus is delayed in sows weaned during the summer, then P.G. 600 is effective in reversing this condition.

Literature Cited

Paterson, A.M. Pearce, GR. Foxcroll, GR. and Reed, HC.B., 1984. Reproductive performance of gilts induced into puberty with estradiol benzoate or a combination of Pregnant Mare's Serum Gonadotropin and Human Chorionic Gonadotropin. *Animal Production* 38:121

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Merck Animal Health Technical Report No. 4

The Attainment of Estrus in Sows Administered with 400 I.U. Pregnant Mare Serum Gonadotropin and 200 I.U. Human Chorionic Gonadotropin at Weaning

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Table 1. Number of Sows that Exhibited Estrus after Farrowing

	Exhibited Estrus	Failed to Exhibit Estrus
Farm A		
Injected ^a	42	4
Not injected	32	2
Farm B		
Injected ^a	39	1
Not injected	38	1

^aTreatment did not affect the number of sows that reached estrus after farrowing.

Table 2. Days to Estrus after Farrowing for Sows that Exhibited Estrus

Week of weaning	Injected	Not injected
Farm A		
July 20, 1987	11.5 (9) ^c	11.75 (7)
July 27, 1987	6/2 (10)	9.5 (7)
Aug. 3, 1987	4.7 ^a (7)	26.4 ^b (4)
Aug. 10, 1987	6.4 (7)	13.8 (6)
Aug. 17, 1987	7.2 (9)	12.7 (7)
Farm B		
July 13 thru Sept. 25, 1987	5.8 (39)	6.8 (38)

^{a,b}Means in the same row with different superscripts differ ($P < 0.0500$).

^c Number of observations per sub-class.

Table 3. Number of Sows that Exhibited Estrus by Day Eight after Farrowing

	Exhibited Estrus Before Day Eight	Exhibited Estrus After Day Eight
Farm A		
Injected	36 ^a	4 ^a
Not injected	19 ^b	13 ^b
Farm B		
Injected	35	4
Not injected	32	6

^{a,b}Numbers in the same column with differing superscripts differ ($P < 0.01$).

P.G. 600[®]

(Serum Gonadotropin and Chorionic Gonadotropin)

DESCRIPTION:

Gilts normally reach puberty (begin experiencing normal estrous cycles and exhibiting regular estrus or heat) at any time between six and eight months of age, although some gilts will not have exhibited their first estrus at ten months of age. Age at first estrus is influenced by several factors including breed type, season of the year, environmental conditions, and management practice (Hurtgen, 1986).

Sows normally exhibit estrus three to seven days after weaning their litters; however, some otherwise healthy sows may not exhibit estrus for 30 days or more after weaning (Dial and Britt, 1986).

The causes of delayed return to estrus in healthy sows are poorly understood, but probably include season of the year (so-called seasonal anestrus; Hurtgen, 1979), adverse environmental conditions, such as high ambient temperatures (Love, 1978), and the number of previous litters, because the condition is more prevalent after the first litter than after later litters (Hurtgen, 1986).

P.G. 600 is a combination of serum gonadotropin (Pregnant Mare Serum Gonadotropin or PMSG) and chorionic gonadotropin (Human Chorionic Gonadotropin or HCG) for use in prepuberal gilts (gilts that have not yet exhibited their first estrus) and in sows at weaning. It is supplied in freeze-dried form with sterile diluent for reconstitution.

In gilts and sows, the action of serum gonadotropin is similar to the action of Follicle-Stimulating Hormone (FSH), which is produced by the animals' anterior pituitary gland. It stimulates the follicles of the ovaries to produce mature ova (eggs), and it promotes the outward signs of estrus (heat).

The action of chorionic gonadotropin in gilts and sows is similar to the action of Luteinizing Hormone (LH), which is also produced by the animals' anterior pituitary gland. It causes the release of mature ova from the follicles of the ovaries (ovulation), and it promotes the formation of corpora lutea, which are necessary for the maintenance of pregnancy once the animals have become pregnant.

The combination of serum gonadotropin and chorionic gonadotropin in P.G. 600 induces fertile estrus in most prepuberal gilts and weaned sows three to seven days after administration (Schilling and Cerne, 1972; Britt et al., 1986; Bates et al., 1991). The animals may then be mated or, in the case of gilts, mating may be delayed until the second estrus after treatment.

NOTE: P.G. 600 IS INTENDED AS A MANAGEMENT TOOL TO IMPROVE REPRODUCTIVE EFFICIENCY IN SWINE PRODUCTION OPERATIONS. TO OBTAIN MAXIMUM BENEFIT FROM THIS PRODUCT, ESTRUS DETECTION AND OTHER ASPECTS OF REPRODUCTIVE MANAGEMENT MUST BE ADEQUATE. IF YOU ARE IN DOUBT ABOUT THE ADEQUACY OF YOUR BREEDING PROGRAM, CONSULT YOUR VETERINARIAN.

P.G. 600 is available in two package sizes:

SINGLE DOSE VIALS (order Code No. PG-720-1) - Five vials containing white freeze-dried powder, plus five vials containing sterile diluent. When reconstituted, each single dose vial (5 mL) of P.G. 600 contains:

SERUM GONADOTROPIN (PMSG) 400 IU
CHORIONIC GONADOTROPIN (HCG) 200 IU
(equivalent to 200 USP Units chorionic gonadotropin)

FIVE DOSE VIALS (order Code No. PG-720-5) - One vial containing white freeze-dried powder, and one vial containing sterile diluent. When reconstituted, the five dose vial (25 mL) of P.G. 600 contains:

SERUM GONADOTROPIN (PMSG) 2000 IU
CHORIONIC GONADOTROPIN (HCG) 1000 IU
(equivalent to 1000 USP Units chorionic gonadotropin)

INDICATIONS FOR USE:

PREPUBERAL GILTS: P.G. 600 is indicated for induction of fertile estrus (heat) in healthy prepuberal (non-cycling) gilts over five and one-half months of age and weighing at least 85 kg (187 lb.).

SOWS AT WEANING: P.G. 600 is indicated for induction of estrus in healthy weaned sows experiencing delayed return to estrus.

CAUTIONS:

Treatment will not induce estrus in gilts that have already reached puberty (begun to cycle). Gilts that are less than five and one-half months of age or that weigh less

than 85 kg (187 lb.) may not be mature enough to continue normal estrus cycles or maintain a normal pregnancy to full term after treatment.

Treatment will not induce estrus in sows that are returning to estrus normally three to seven days after weaning. Delayed return to estrus is most prevalent after the first litter; the effectiveness of P.G. 600 has not been established after later litters. Delayed return to estrus often occurs during periods of adverse environmental conditions, and sows mated under such conditions may farrow smaller than normal litters.

DOSAGE AND ADMINISTRATION:

One dose (5 mL) of reconstituted P.G. 600, containing 400 IU serum gonadotropin (PMSG) and 200 IU chorionic gonadotropin (HCG), should be injected into the gilt or sow's neck behind the ear.

Prepuberal gilts should be injected when they are selected for addition to the breeding herd. Sows should be injected at weaning during periods of delayed return to estrus.

DIRECTIONS FOR USE:

SINGLE DOSE VIALS: Using a sterile syringe and a sterile 0.90 x 38 mm (20 G x 1½") hypodermic needle, transfer the contents of one vial of sterile diluent (5 mL) into one vial of freeze-dried powder. Shake gently to dissolve the powder. Inject the contents of the vial into the gilt or sow's neck behind the ear.

FIVE DOSE VIAL: Using a sterile syringe and a sterile 0.90 x 38 mm (20 G x 1½") hypodermic needle, transfer approximately 5 mL of the sterile diluent into the vial of freeze-dried powder. Shake gently to dissolve the powder. Transfer the dissolved product back into the vial of diluent and shake gently to mix. Inject one dose (5 mL) of the reconstituted solution into the gilt or sow's neck behind the ear.

STORAGE PRECAUTIONS:

Store at 36-46°F (2-8°C).

Once reconstituted, P.G. 600 should be used immediately. Unused solution should be disposed of properly and not stored for future use.

Spent hypodermic needles and syringes generated as a result of the use of this product must be disposed of properly in accordance with all applicable Federal, State and local regulations.

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