Post-Weaning Exogenous Gonadotropins Treatment for Improved Swine Reproduction

M.A. Christenson, J.E. Tilton, R.M. Weigl and J.D. Crenshaw

Profitability of the sow herd is affected by the incidence of postweaning anestrus, the weaning to estrus interval and fertility at the postweaning estrus. The interval from weaning to estrus is affected by lactation length (Varley, 1982; Dzuik, 1977), genotype, age, parity (Maurer et al., 1981), season and plane of nutrition (Hughes and Varley, 1980; Dyck, 1972). Pituitary gonadotropic preparations, pregnant mare serum gonadotropin (PMSG), human chorionic gonadotropin (hCG), hypothalamic releasing hormones (GnRH), or a combination of these hormones have been widely used to induce follicular growth or ovulation (Webel and Day, 1982; Britt et al., 1985). Combinations of PMSG + hCG have decreased the time to estrus (Hurtgen and Leman, 1979; Christenson et al., 1972), synchronized estrus (Longnecker and Day, 1968; Christenson and Teague, 1975; Foxcroft et al., 1984; Lancaster et al., 1986) or induced estrus in noncycling sows (Dzuik and Dhindsa, 1969). The objective of this experiment was to determine the effect of various gonadotropin combinations administered one day postweaning on subsequent reproductive performance in postweaning sows.

MATERIALS AND METHODS

Three swine operations located in northeastern North Dakota were chosen to test the feasibility of using gonadotropins postweaning to stimulate reproductive performance. Both gilts producing their first litter and sows that had farrowed previously were utilized. All sows had typically lactated 28 days. Sows were assigned by the producer to one of three groups. They were: Group I - saline; Group II - G-600; and Group III - G-900. All injections were given subcutaenously 24 hours after weaning.

The treatment doses were produced by dissolving gonadotropins in separate volumes of physiological saline solution. All sows were mated twice at the first estrus postweaning. All pregnant sows subsequently were farrowed. Days from weaning to estrus and conception rates were determined. Farrowing records were utilized to establish number of live pigs farrowed. Number of dead pigs at birth was also ascertained.

Christenson is graduate assistant, Tilton is professor, Weigl is research specialist, and Crenshaw is assistant professor, Department of Animal and Range Sciences.

Students "t" test was used to to test for mean differences between groups. Because of homogeneity of the variances, the data within groups was combined and between group means were tested.

RESULTS AND DISCUSSION

The combined results of the sow performance at the three locations is presented in Table 1. The use of gonadotropin combinations significantly reduced the weaning to estrus interval (4.42 days), G-600; 4.46 days, G-900) when compared to the control group (4.98 days). These results agree with Lancaster et al. (1985) who reported that sows treated with various combinations of PG600 and estradiol benzoate (EB) had shorter weaning to estrus intervals than controls. Decreased weaning to estrus intervals in PMSG/hCG treated sows were also observed by Christenson et al. (1972), Webster (1978) and Fisher et al. (1985). The physiological role of gonadrotropin combinations administered 24 hours postweaning involves the synergistic action of follicle stimulating hormone (FSH) and luteinizing hormone (LH). Shaw and Foxcroft (1985) concluded the role of LH

Table 1. Combined Reproductive Performance of Postweaning Sows Treated with Gonadotropins

	Treatment		
	Saline	G-600	G-900
Weaning to estrus interval, days	4.98[a]	4.42[b]	4.46[b]
(± SD)	1.05	.72	.73
N	43	46	48
Pigs born alive	9.69[a]	11.08[b]	11.11[b]
(± SD)	3.79	2.09	2.66
N	36	42	38
Pigs born dead	.64	.79	1.18
(± SD)	1.27	1.54	1.70
N	36	42	38
Conception rate, %	86	93	86

Superscripts bearing different letters differ statistically.
Weaning to estrus interval, ($P < .05$).
Pigs born alive, ($P < .10$).

in the weaned sow was related to the timing of estrus and the effect of FSH was on the selection of ovulatory follicles and the determination of ovulation rate. The role of PMSG/hCG appears to be to stimulate follicular development and increase estrogen concentrations to stimulate an earlier LH surge and ovulation.

The number of pigs born alive (Table 1) was slightly increased in the treated groups. Sows treated with G-900 had the most pigs born alive (11.11) when compared to G-600 (11.08) and the controls (9.69). The G-900 group (Table 1) also had slightly more pigs born dead (1.18) compared to the control and G-600 groups (0.64 and 0.79 pigs, respectively). Schilling and Gerne (1972) and Lancaster et al. (1985) both reported that G-600 increased litter size, suggesting that an increase in FSH resulted in increased follicular development and ovulation rate.

Conception rates were similar for the control and G-900 groups (86%) but was improved for the G-600 group (93%). Gonadotropin treatment reduced the standard deviation for weaning to estrus intervals (4.98 ± 1.05, control; 4.46 ± .73, G-900; 4.42 ± .72, G-600) suggesting a greater degree of estrus synchronization following weaning.

The results of sow performance at the individual locations are presented in Table 2. There were no statistical differences among the treatment groups when comparing the use of gonadotropin treatments by location. However, there was a significant location effect.

These results suggest that treatment with gonadotropin combination 24 hours postweaning will decrease the weaning to estrus interval and increase the number of pigs born alive. The use of gonadotropin combinations is a tool that must be implemented with good management practices.

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Table 2. Reproductive Performance by Location of Postweaning Sows Treated with Gonadotropins

Treatment:	Saline			G-600			G-900		
Location:	A	B	C	A	B	C	A	B	C
Weaning to estrus interval, days	4.56	—	5.09	4.00	4.50	4.55	4.00	4.38	4.66
(± SD)	1.26	—	.98	.00	.50	.85	.00	.48	.84
N	9	—	32	11	12	29	11	8	29
Pigs born alive	10	—	9.89	12	9.89	11.14	12.38	10.50	10.83
(± SD)	4.58	—	3.27	2.79	1.85	3.10	3.04	1.71	2.59
N	8	—	27	10	9	29	8	6	24
Pigs born dead	1.50	—	.41	1.90	.67	.45	2.88	.50	.79
(± SD)	2.18	—	.68	2.74	.82	.77	2.20	.50	1.29
N	8	—	27	10	9	29	8	6	24