BRIEF COMMUNICATION

# The Influence of Feeding Allyl Trenbolone During Late Lactation on the Reproductive Performance of Primiparous and Multiparous Sows

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Major constraints on efficient swine production include extended remating intervals and relatively small litter sizes (1) and these two constraints are particularly evident with sows after weaning their first litters. When rebreeding of sows was delayed until at least 12 days after weaning, subsequent litter size increased (2). The mean remating interval in the latter study, however, exceeded 21 days and probably reflects the fact that many sows were rebred at their second postweaning estrus. The mechanism controlling the improvement in litter size is unknown, although an effect on ovulation rate has been suggested (3). If the same effect could be achieved without the necessity of delayed mating, this would be of considerable benefit to swine producers.

It is known that the inclusion of the synthetic progestagen allyl trenbolone (AT) (Regumate, UCLAF Corp., New York) in the diet at 20 to 40 mg daily will suppress estrus in postpubertal gilts and lead to a synchronized estrus after its withdrawal (4). The feeding of AT to primiparous sows from weaning for three to seven days has also been shown to suppress estrus and lead to an extended, yet predictable and more synchronous remating interval, and is also accompanied by an improved subsequent litter size (5,6,7). Further, a recent pilot study demonstrated an increase in litter size of between 1 and 1.5 pigs following dietary inclusion of AT for the last ten days of lactation in primiparous sows (7). This latter protocol allows the benefits of feeding AT without extending the remating interval and is thus worthy of further consideration. We therefore designed an experiment to further investigate the influence of feeding AT during the last ten days of lactation on the subsequent performance of both primiparous and multiparous sows.

Fifty primiparous and 41 multiparous (parities 2 to 6) sows were allocated randomly either to be fed 20 mg of AT daily for the last ten days of a 35 d lactation (including the days of weaning), or to serve as controls. The AT, in a solution of oil, was mixed and fed with a small amount of feed each morning to ensure its complete consumption. The AT dispenser automatically supplied the correct dosage.

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Sows were housed in farrowing crates and individually fed either 4 kg (primiparous sows) or 5 kg (multiparous sows) daily of a 13% crude protein diet having 16 MJ.DE $kg^{-1}$. Water was available *ad libitum* throughout the experimental period. Litter size differences during the treatment (current) lactation were minimized by cross fostering of pigs within 3 d of birth.

Following weaning, sows were housed adjacent to boars and checked daily for onset of estrus. Sows were served at least twice during the estrous period by a boar of proven fertility. From 18 to 24 d after mating, all bred sows were checked with a boar for returns to service. Remating intervals and subsequent litter sizes at birth were recorded. The main effects of treatment were evaluated using general linear model procedures (8).

As shown in Table I, the feeding of AT to primiparous sows during the last ten days of lactation increased the interval between weaning and remating ($P < 0.05$). This is possibly a consequence of a carry-over effect of the AT, but does not reflect any lack of synchronization of the postweaning estrus. In contrast, there was no treatment effect on the remating interval in multiparous sows, which agrees with earlier findings (6). It is interesting that, contrary to previously published data (9), there was no difference in the duration of the remating interval between primiparous and multiparous sows in the present experiment. The action of AT is to suppress follicular development, and its withdrawal is followed by a normal follicular phase. Since the controls in both parity groups showed a normal weaning to estrus interval, no beneficial action of AT on the mean remating interval was apparent. Whether AT would prove of benefit to herds experiencing chronic delayed postweaning estrus remains to be fully explored, but a beneficial effect under these circumstances has been suggested (7) and is worthy of further investigation.

The second litter size of the control primiparous sows was non significantly smaller than their first (Table I), which is contrary to previously published data (10,11). In contrast, AT-treated primiparous sows showed the expected parity effect on litter size indicating a beneficial effect on litter size in these sows. A similar situation was noted for multiparous sows. Although AT-treated multiparous sows had a nonsignificantly smaller subsequent litter size than con-

**TABLE I**
**Influence of Feeding Allyl Trenbolone (20 mg $d^{-1}$) to Primiparous and Multiparous Sows for the Last Ten Days of the Current Lactation on Subsequent Reproductive Performance**

| | Primiparous | | | Multiparous | | |
|---|---|---|---|---|---|---|
| | Control | Regumate | SEM | Control | Regumate | SEM |
| Number of sows | 25 | 25 | | 21 | 20 | |
| Remating interval (d) | 5.4a | 7.0b | 0.3 | 6.4 | 6.7 | 0.6 |
| Current litter size | | | | | | |
| (total at birth) | 10.6 | 10.4 | 0.4 | 12.4 | 10.8 | 0.4 |
| (alive at birth) | 10.2 | 9.8 | 0.4 | 10.9 | 10.2 | 0.4 |
| Subsequent litter size | | | | | | |
| (total at birth) | 10.1 | 10.9 | 0.5 | 12.7 | 11.6 | 0.5 |
| (alive at birth) | 9.7 | 10.2 | 0.5 | 10.5 | 9.9 | 0.4 |

Within parity group, means followed by different subscripts differ, ab ($P<0.05$). Means not followed by subscripts do not differ ($P>0.05$)

trols, the increase in litter size between the current and subsequent parity was greater in the AT-treated sows. However, given the low repeatability of litter size (12), the biological significance of this observation is open to question.

The mechanism whereby AT may mediate increases in litter size remains to be determined. Earlier work has shown that AT treatment of pre- and postpubertal gilts will result in larger first litter sizes (13,14), and this has been attributed to an increase in ovulation rate (13). How the AT increased ovulation rate is as yet unknown. The AT may, however, be having an effect on hepatic enzyme systems and as such mediate an increased plasma steroid metabolic clearance rate, similar to that discussed for phenobarbital in sheep (15). It has been suggested that under these conditions a reduction in the steroid negative feedback to the hypothalamic-pituitary axis will result, ultimately causing an increased ovulation rate (15). If ovulation rate acts to limit litter size, then an increased ovulation rate may result in larger litters. However, the mean litter sizes for the control sows in the present experiment were relatively large, especially for the primiparous sows, indicating that ovulation rate was probably not a limiting factor. Therefore, it is possible that the AT had increased the ovulation rates, but this increase was not reflected in the number of piglets born. The effectiveness of AT for increasing litter size may be limited to situations where the mean litter size is relatively small.

**We found that feeding AT to sows had no significant benefit to their subsequent reproductive performance**

In conclusion, we found that feeding AT to sows had no significant benefit to their subsequent reproductive performance. The true potential of this compound, however, may only be realized in herds suffering poor sow reproductive performance.


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