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Effect of PGF 2a on parturition induction, litter performance and oestrus synchronization in brood sows

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EFFECT OF PGF_{2a} ON PARTURITION INDUCTION, LITTER PERFORMANCE AND OESTRUS SYNCHRONIZATION IN BROOD SOWS*

By

S. KYRIAKIS, C. STOITSIOU, C. TSALTAS, P. TSAKALOF**

ΕΠΙΔΡΑΣΗ ΤΗΣ PGF_{2a} ΣΤΗΝ ΕΝΑΡΞΗ ΤΟΚΕΤΟΥ, ΑΠΟΔΟΣΕΙΣ ΤΗΣ ΤΟΚΕΤΟΜΑΔΟΣ ΚΑΙ ΣΥΓΧΡΟΝΙΣΜΟΥ ΤΟΥ ΟΙΣΤΡΟΥ ΣΤΙΣ ΧΟΙΡΟΜΗΤΕΡΕΣ

Υπό

Σ. ΚΥΡΙΑΚΗ, Κ. ΣΤΟΥΤΣΙΟΥ, Κ. ΤΣΑΛΤΑ, Π. ΤΣΑΚΑΛΟΦ**

Π Ε Ρ Ι Λ Η Ψ Η

Ο πειραματισμός αυτός έγινε σε βιομηχανικού τύπου χοιροτροφική μονάδα δυναμικότητας 500 χοιρομητέρων. Σ' αυτόν πήραν μέρος 20 χοιρομητέρες (T2) στις όποιες έγινε έγχυση 12 mg PGF_{2a} μεταξύ 109 - 113ης ημέρας της έγκυμοσύνης. Άλλες 20 χοιρομητέρες του ίδιου γενετικού δυναμικού, που διαβιούσαν κάτω από τις ίδιες συνθήκες έκτροφής, χρησιμοποιήθηκαν ως μάρτυρες (T1). Ο τοκετός μετά την έγχυση της PGF_{2a} εξελίχθηκε φυσιολογικά και άρχισε σε 36,7 ± 2,63 ώρες. Τα αποτελέσματα από την έγχυση της PGF_{2a} στην ομάδα T2, σε σύγκριση με την ομάδα T1 έχουν ως εξής:

- 1) Διάρκεια κυοφορίας: T1= 113,9 ± 0,65 ήμ., T2= 111,2 ± 0,64 ήμ. (P<0,001).
- 2) Δέν παρατηρήθηκε καμιά διαφορά στον αριθμό των γεννηθέντων χοιριδίων και στη βιοσιμότητα των τοκετοομάδων την 21η, 30η και 45η ημέρα.
- 3) Τα μέσα σωματικά βάρη των χοιριδίων είχαν διαφορές την ημέρα της γεννήσεως (P<0,05), την 21η ήμ. (P<0,001), την 30η ήμ. (P<0,001 - άπογαλακτισμός) και την 45η ημέρα (P<0,01 - διαφορά 1,103 χλγ) υπέρ της T1 ομάδας.
- 4) Ήμέρα όχλειας μετά τον άπογαλακτισμό: T1= 7,9 ± 1,77 (ποσοστό 80% των χοιρομητέρων - έγκυμοσύνη 90%) και T2= 5,55 ± 0,63 (ποσοστό 85% των χοιρομητέρων - έγκυμοσύνη 85%) (P<0,02).
- 5) Τέλος, στον έπόμενο τοκετό που έγινε χωρίς καμιά θεραπευτική άγωγή, δέν παρατηρήθηκαν διαφορές μεταξύ των χοιρομητέρων των δύο πειραματικών ομάδων.

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INTRODUCTION

The administration of PGF_{2a} to sows has already been investigated for either purely obstetrical (2,3) or for zootechnical purposes (5).

As regards oestrus synchronization, owing to the different way PGF_{2a} acts on the C.L. of the sow in relation to that of the cow (1), the use of PGF_{2a} has been limited to the induction of synchronized parturitions (4), thus effecting oestrus synchronization in an indirect manner.

The purpose of our experiment was to study under Greek conditions on industrialized pork production:

- a. the effectiveness of PGF_{2a} in planning and synchronizing parturitions and, indirectly, the onset of the subsequent oestrus,
- b. the effect of PGF_{2a} on litter size and subsequent yields.

MATERIALS AND METHODS

The present experiment was conducted between Nov. 1977 and Oct. 1978 in a 500 commercial pig breeding-fattening unit.

A total of 40 F1 Landrace X Large White polytocous sows, bred to 4 different Large White boars aged 1.5 - 2.5 years, were used. The initial number of brood sows under surveillance was 25% higher. This made possible the immediate removal and replacement from the experiment of any sow or piglet that showed signs of failing health without affecting the statistical data of the experiment.

The conditions of management were the same for all brood sows and their litters of the experiment.

All preventive measures against infections and parasitic diseases were taken for all animals and particularly for those of the experiment.

The 40 sows finally selected were randomized into two groups of 20 animals each (T1, T2).

The animals of T1 served as controls, while the animals of T2 were injected with 12mg PGF_{2a} (Prosteron (R) Adelfco), between 109-113 days of pregnancy.

The results of the administration of PGF_{2a} were followed up until the next parturition that occurred naturally.

Statistical analysis of the results was carried out by the «t» test.

RESULTS

1. Duration of gestation

The gestation period for the animals of group T1 was $113,95 \pm 0,65$ days and for those of group T2, $111,2 \pm 0,64$. The difference was highly significant ($P < 0,001$). The average time elapsed between the injection of PGF_{2a} and onset of parturition among the animals of T2 amounted to $36,7 \pm 2,65$ hours. All sows farrowed normally.

2. Litter size and survival

There was no significant difference in litter size and survival on the 1st, 21-

st, 30th and 45th day of life, which marked the end of the follow-up period for the animals of both groups.

All piglets were weaned on the 30th day, when their dams were removed from their boxes and led to the breeding stalls. Thus, all piglets remained in the sow boxes in which they were born and reared to the 45th day of life, so as to ensure the best conditions of follow-up.

3. Litter liveweight

Average bodyweights of piglets of the T1 and T2 groups at various stages of their development are summarized in table 1.

TABLE I
Showing piglet weights at various stages of development

	At birth	21st day	30th day	45th day
T1	1.193	4.280	5.926	14.705
T2	1.095	3.765	4.683	13.602
P	0.05	0.001	0.001	0.01

4. Period of time between weaning and next oestrus

The number of days that elapsed between farrowing and the onset of the subsequent oestrus was, for the animals of T1 $7,1 \pm 1,77$ and was observed among 80% of the animals with a conception rate of 90%, while for the animals of T2 $5,55 \pm 0,63$, and was observed among 85% of the animals, with a conception rate of 85% ($P < 0,02$).

5. Next parturition

No statistical or even numerical difference was observed in the size of the litters between the induced and the subsequent «natural» parturition, for both experimental groups of brood sows.

DISCUSSION AND CONCLUSION

The slight difference in body weight on the 45th day between the piglets of T1 and T2 (1.103 kg) is, perhaps, the only contra indication for the application of PGF_{2a} to brood sows. This however, should have no influence on the yields of fattening pigs, from the 45th day to day of slaughter (5th or 6th month of life). However, it is quite obvious that PGF_{2a} can be effectively used to a) plan parturitions, thus indirectly synchronizing the next oestrus, b) reduce the time period between weaning and the next oestrus.

Moreover, the fact that there was no negative effect on the fertility of the next farrowing, shows that PGF_{2a} may prove to be of importance in improving pork production in general.

Further trials on PGF_{2a} should furnish additional information on how the cost of pork thus produced is affected by the cost of repeated PGF_{2a} administrations.

SUMMARY

The experiment was conducted in a livestock unit of 500 brood sows and comprised a total of 40 animals, of the same genetic potential and reared under the same management conditions. Of these animals, 20 were injected with 12mg PGF_{2a} (group T2) between days 109-113 of pregnancy, while the remaining 20 (group T1) were used as controls. All parturitions were unevenful and were induced 36.7 ± 2.63 hrs after the injection of PGF_{2a}. The results of the administration of PGF_{2a} to the animals of group T2, in comparison with those of group T1, can be summarised as follows: 1) Duration of pregnancy: T1= 113.9 ± 0.65 days, T2= 111.2 ± 0.64 days (P/0.001). 2) No difference was observed in the number of piglets born and the survival rate of the litters, 1,21, 30 and 45 days after farrowing. 3) The mean body weights showed significant differences on parturition (P/0.005), and on the 21st (P/0.001), the 30th (P/0.001 day of weaning) and the 45th day of life (P/0.01 - difference of 1,103 kg) in favour of the controls (group T1). 4) The animals of group T1 showed oestrus and were bred 7.9 ± 1.77 days after weaning (80% of the sows in oestrus - conception rate 90%), while these of group T2 showed oestrus and were bred 5.55 ± 0.63 days after weaning (85% of the sows in oestrus - conception rate 85%) (P/0.02). 5) At the subsequent parturition that occurred without any treatment, no difference whatsoever was observed in any animal of both experimental groups.

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