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THE PROFITABILITY OF P.G. 600® IN WELL MANAGED SOW HERD

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The profitability of P.G. 600® in well managed sow herd

Adequate results in reproduction are one of the key points for successful pig production. P.G. 600®, a combination of pregnant mare serum gonadotropine and human chorionic gonadotropine is used as oestrus promoter on many pig farms. The profitability of P.G. 600® treatment was tested on primiparous sows on well managed farm with 2.500 sows and 14.04 liveborn piglets per litter. The experiment lasted for a period of one year. The experimental group, 502 animals, was treated with P.G. 600® at weaning of the first litter. Control group, 503 animals, was not treated. Data were evaluated according to four seasons: spring, summer, autumn and winter. The costs of feed, sow depreciation, building, labour and P.G. 600® treatment in experimental group were calculated for the period from weaning to successful insemination or from weaning to culling. In P.G. 600® group production costs were lower in spring (–0.68 EUR per born piglet) and in summer (–0.88 EUR per born piglet), but not in autumn (+0.05 EUR per born piglet) and in winter (+0.46 EUR per born piglet). The calculated total benefit on the farm with yearly production of 65 thousand 30 kg pigs was 3,249 EUR. Calculated benefit for only spring and summer use was 4.937 EUR. The last number represents only 0.15 to 0.19% of estimated turnover of the farm. The use of P.G. 600® on well managed farm will not increase profitability of production.

Key words: pigs / primiparous sows / reproduction / oestrus / promoters / profitability

Gospodarnost uporabe P.G. 600® v dobro vodeni čredi svinj

Primerni rezultati reprodukcije so ključnega pomena za uspešno prašičerejsko proizvodnjo. P.G. 600®, ki je kombinacija serumskega gonadotopina brejih kobil in človeškega horionskega gonadotropina, se pogosto uporablja kot spodbujevalec estrusa. Gospodarnost uporabe P.G. 600® smo preizkusili na svinjah prvesnicah na dobro vodenem obratu z 2.500 svinjami in 14,04 živorojenimi pujski po gnezdu. Poskus je trajal eno leto. Poskusno skupino, 502 živali, smo tretirali s P.G. 600® ob odstavitvi prvega gnezda. Kontrolne skupine, 503 živali, nismo tretirali. Podatke smo obdelali po štirih letnih sezonah: pomlad, poletje, jesen in zima. Stroške za krmo, amortizacijo svinje in objektov ter opreme, dela in tretiranja s P.G. 600® v poskusni skupini smo ocenili za obdobje od odstavitve do uspešne osemenitve ali do izločitve. Stroški v skupini, tretirani z P.G. 600® , so bili nižji spomladi (–0,68 EUR po rojenem pujsku) in poleti (–0,88 EUR po rojenem pujsku), ne pa jeseni (+0,05 EUR) in pozimi (+0,46 EUR). Na farmi z letno proizvodnjo 65 tisoč 30 kg težkih pujskov so se stroški znižali za 3.249 EUR. Če bi preparat uporabljali le spomladi in poleti, bi privarčevali 4.973 EUR. To predstavlja le 0,15 do 0,19 % letnega prihodka farme. Uporaba P.G. 600® na dobro vodenem obratu ne bi izboljšala gospodarnosti.

Ključne besede: prašiči / svinje / prvesnice / reprodukcija / estrus / spodbujevalci / gospodarnost

1 INTRODUCTION

Successful reproduction is one of the key points in effective pig production. It can be achieved by proper management of sows during production cycle or/and with the help of hormonal treatment of sows. The P.G.600® (Scheering Plough Animal Health), which contains in one dose 400 IE Pregnant Mare Serum Gonadotropine (PMSG) and 200 IE Human Chorionic Gonadotropine (HCG), is used for inducing precocious puberty and fertile oestrus in gilts and sows (Estienne *et al.*, 2002; Fernandez *et al.*, 2005; Horsley *et al.*, 2005). Treatment with P.G. 600®

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induces fertile oestrus in sows weaned during summer months within 3 to 5 days following injection (Hurtgen *et al.*, 1979, Webster, 1978). It affects weaning to oestrus interval and increases first service conception rates (Marbry *et al.* 1996; Marsteller *et al.*,1997). Primiparous sows are known for irregular reproduction cycle. Primiparous sows, treated with P.G. 600® at weaning had a shorter and more synchronous weaning to oestrus interval compared to untreated sows (Kirkwood *et al.*, 1998). Season affects the reproductive performance of sows. Extended weaning to oestrus interval and persistent anoestrus may occur when litters are weaned during the summer months (Hurtgen *et al.*,1980; Britt *et al.*,1983). In sows which litters were weaned in summer and early fall after a three to four week lactation, treatment with P.G. 600® at weaning significantly shortened the period between weaning and oestrus of first and second parity sows and reduced post weaning anoestrus in primiparous sows (Bates *et al.*, 1991).

The aim of this study was to find out whether the treatment with P.G. 600® has an economic impact on reproduction of primiparous sows during the whole year, i.e. during the spring, summer, autumn and winter season on well managed sow farm in moderate climatic conditions in Slovenia.

2 MATERIAL AND METHODS

The experiment was carried out on a weaner production farm with 2,500 sows. It lasted for one calendar year. The average litter size on the farm was according to internal data 14.04 liveborn piglets per litter. All primiparous sows were introduced in the experiment. Animals were divided into two groups. The experimental group was treated on weaning day with 5 ml P.G. 600® containing 400 IU PMSG and 200 IU HCG (Intervet – Schering Plough Animal Health, NJ). The control group was not treated. Both groups, experimental and control were handled according to regular procedure on that farm. Data were collected routinely.

The data were divided into four seasonal groups: spring, summer, autumn, winter. The criterion was the weaning day of previous litter. The winter season was between December 22 and March 21, the spring season between March 22 and June 21, the summer season between June 22 and September 21 and the autumn season between September 22 and December 21.

Average litter size and average number of liveborn piglets per litter were calculated from delivered data. The days between weaning of first litter and successful insemination per born piglet (WSI) include feed days from two sources: between weaning and successful insemination for pregnant sows and between weaning and culling for nonpregnat sows. WSI is calculated according to the following formula:

$$WSI = \frac{\sum_{i=1}^{n}(A_i - W_i) + \sum_{k=1}^{l}(C_k - W_k)}{\sum_{i=1}^{n} LS_i}$$

The WSI is number of days between weaning and successful insemination in days per born piglet, A_i is the age of sow i at successful insemination, W_i is the age of sow i at weaning, C_k is the age of sow k at culling, W_k is the age of sow k at weaning and LS_i is the litter size of the sow i. The percentages of first time inseminated sows (FI), of second time inseminated sows (SI) and farrowing rate (FR) are calculated as percentages from all weaned sows after first litter. The feed consumption per piglets is calculated for the same period as WSI. All, pregnant and nonpregnant sows are included.

The costs for feed, labour, building and sow (depreciation) were estimated from internal data. The estimated values were:

- The feed costs: All sows were fed altogether with 12 kg feed during the first four days after weaning. After five days after weaning all animals, inseminated or not inseminated, pregnant or nonpregnant, were fed with 2.8 kg feed per day. The price of feed for the first period (12 kg) was calculated according to internal data and was 0.28 EUR per kg. The price of other sow feed was according to the same data 0.25 EUR per kg.
- The estimated costs of labour were 0.25 EUR per sow per day – both for pregnant and nonpregnant animals.
- The estimated costs of building were 0.30 EUR per sow per day.
- The costs of sow (depreciation):
  - The value of gilt was estimated on 350 EUR and the value of culled animal on 120 EUR.
  - According to internal data sows farrow 4.5 times per life. Depreciation for successfully inseminated (farrowed second litter) sows was calculated per farrowing as 230 EUR/4.5 ≈ 51.00 EUR.
  - For nonpregnant (culled) sows was calculated as: 230 EUR – 51 EUR = 179 EUR. The 51 EUR was depreciation for first litter.
- The cost of one dose of P.G. 600® (5 ml) with application (labour) was 4.50 EUR per treated sow.

The costs per born piglets – feed, labour, costs of building, and costs of sow (depreciation) were calculated for both groups separately. The costs of experimental

Table 1: *Average litter size, average number of liveborn piglets per litter, number of days per born piglet from weaning to successful insemination (WSI), percentages of first time inseminated sows (FI), of second time inseminated sows (SI), farrowing rate (FR) and kg of feed per born piglet in P.G. 600® (P) and control (C) group as average for whole year and for four seasons*
Preglednica 1: *Povprečna velikost gnezda, povprečno število živorojenih pujskov na gnezdo, število dni na pujska do uspešne osemenitve (WSI), odstotek prvič osemenjenih svinj (FI), odstotek drugič osemenjenih svinj (SI), delež prasitev (FR) in kg krme na rojenega pujska v P.G. 600® (P) in kontrolni (C) skupini v povprečju na leto in za štiri sezone*

		spring pomlad		summer poletje		autumn jesen		winter zima	
	Total Skupaj	C	P	C	P	C	P	C	P
litter size – velikost gnezda	14.11	13.96	14.45	13.49	13.81	14.15	14.19	14.33	14.47
liveborn/litter – živorojenih/gnezdo	14.01	13.89	14.22	13.44	13.63	14.10	14.19	14.19	14.42
WSI	1.21	1.30	1.03	1.25	0.95	1.40	1.30	1.23	1.23
FI (%)	95.52	92.62	96.72	96.09	96.88	94.26	95.16	96.95	95.31
SI (%)	5.67	4.92	6.56	4.69	10.16	1.64	4.03	4.58	8.59
FR (%)	89.45	88.52	91.80	89.06	93.75	86.07	87.10	90.08	89.06
kg feed / piglet – kg krme / pujsek	3.66	3.92	3.15	3.79	2.94	4.22	3.94	3.71	3.71

group were enlarged for P.G. 600® treatment. The average costs per piglet in group include costs for both, pregnant and unpregnant (culled) sows.

The data handling and statistics was done with SAS/BASE and SAS/SQL release 9.2.

3 RESULTS AND DISCUSSION

In the Table 1 average litter size, average number of liveborn piglets per litter, number of days per born piglet between weaning and successful insemination (WSI), percentages of first time inseminated sows (FI) and second time inseminated sows (SI), and farrowing rate (FR) for two groups (P.G. 600® and control group) in four seasons are presented.

The litter size was larger in P.G. 600® group than in control group in all four seasons. The difference was smaller in autumn and in winter than in spring and summer season. The difference between groups was especially small in autumn (14.15 born piglets in control group vs. 14.19 born piglets in P.G. 600® group). The treatment with P.G. 600® strongly influenced only the percentage of first inseminated sows in spring (96.72 % in P.G. 600®

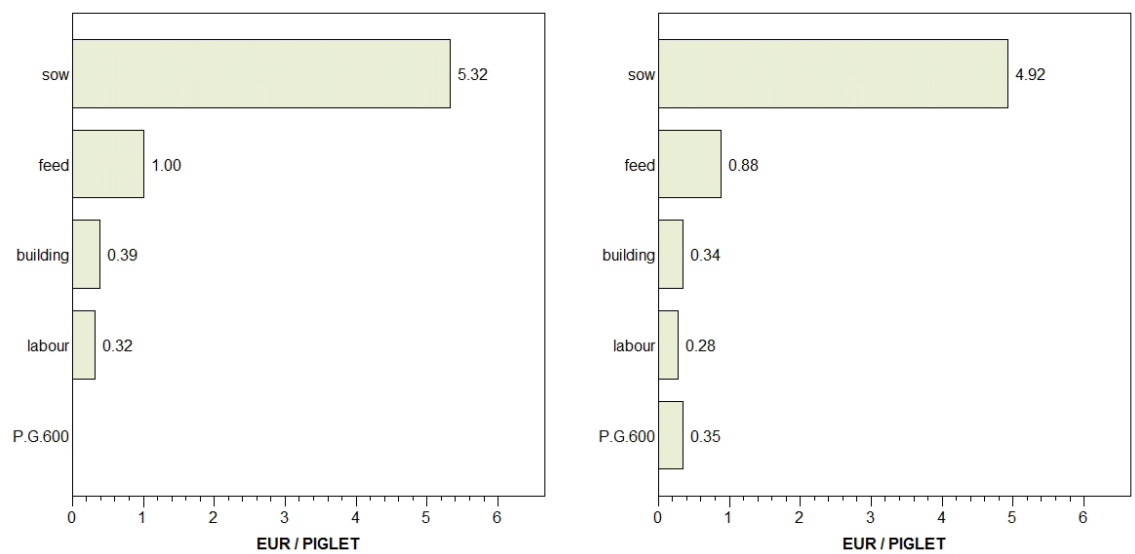

Figure 1: *The structure of costs per piglet on yearly basis: control group (left) and P.G. 600® group (right)*
Slika 1: *Letna struktura stroškov po pujsku: kontrolna skupina (levo) in P.G. 600® skupina (desno)*

group vs. 92.62 % control group). Large percentage of sows, treated with P.G. 600® was reinseminated in summer (10.16% P.G. 600® vs. 4.69% control group). On the other hand, the percentage of reinseminated sows in control group was high in comparison with those treated in winter (P.G. 600® 4.58% vs. control 8.59 %). The percentage of second litter farrowed sows was in all four seasons slightly higher in P.G. 600® group compared to control grouThe sows from experimental group consumed more feed per born piglet. The only exception was the winter period when both groups used the same quantity of feed per born piglet.

The structure of costs per piglet for both groups during the whole year is presented in Fig. 1.

The total costs between weaning and successful insemination per born piglet were 7.03 EUR in control and 6.77 EUR in P.G. 600® grouThe costs of P.G. 600® were 0.35 € per born piglet. All the other costs – sow, feed, building and labour were higher in the control group compared to P.G. 600® grouThe building costs in control group were 0.39 EUR compared to 0.34 EUR in P.G. 600® group, feed costs – 1.00 EUR compared to 0.88 EUR, labour costs 0.32 EUR compared to 0.28 EUR and sow costs (depreciation) – 5.32 EUR compared to 4.92 EUR. Without cost of P.G. 600® the piglet from P.G. 600® group was 0.61 EUR cheaper. The application of P.G. 600® reduced the difference on only 0.26 EUR per born piglet. The depreciation of the sow is the most important cost in the structure and represents between 2/3 and 3/4 of the total costs per piglet between weaning and successful insemination.

Both analyses show that sows from experimental group, i.e. sows treated with P.G. 600®, produced slightly cheaper compared to control grouThe difference between the two groups was larger in spring and summer. The average costs per born piglets for two groups in four seasons are presented in Fig. 2, and the structure of costs in Table 2.

The highest costs in both groups (control group 7.51 EUR vs. 7.55 EUR in P.G. 600® group) were observed in autumn. They were 0.05 EUR higher in P.G. 600® as in control grouWinter results showed unexpected 0.46 EUR lower costs in P.G. 600® grouThe difference was even larger than the costs of one dose of P.G. 600® per piglet. The positive effect of the P.G. 600® treatment was found in spring, when the production of born piglet in P.G. 600® group was 0.68 EUR cheaper and in summer, when the production was 0.88 EUR cheaper than the production in control grouThe economics of P.G. 600® administration depend mostly on higher percentage of successfully inseminated sows, i.e. less culled sows. The other positive effects of P.G. 600® did not cover the costs of P.G. 600®.

In the Table 3 the number of born piglets per seasons for two groups and the total reduction of costs due to the treatment with P.G. 600® according to two scenarios are presented.

A total of 12,681 piglets were born in the second parity during year 2009. The total reduction of costs was 2,126 EUR in spring and 2,812 EUR in summer. The

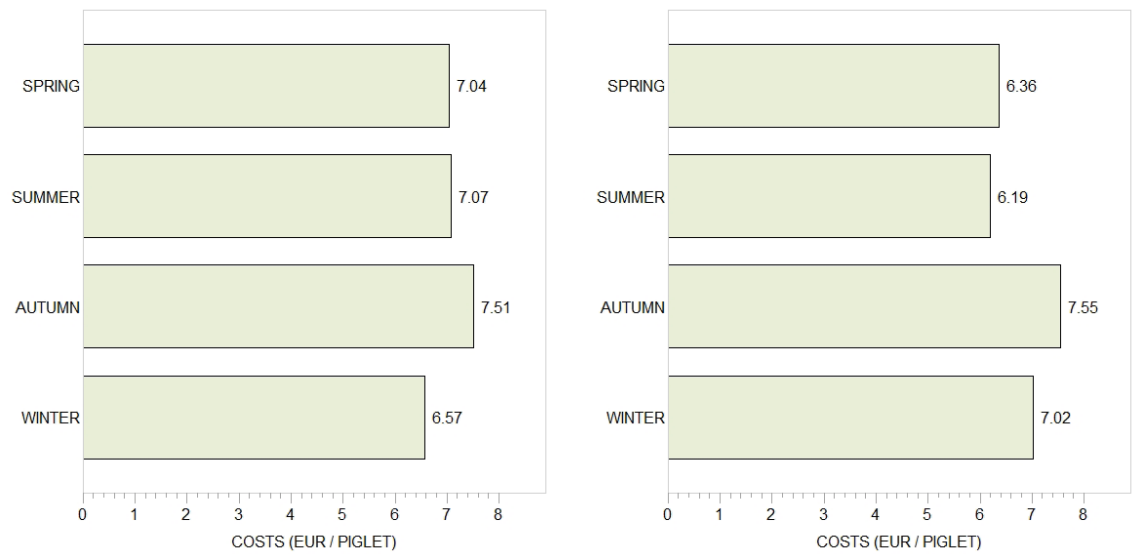

Figure 2: *The average costs per born piglet in period between weaning and successful insemination in four seasons for control (left) and P.G. 600® group in EUR*
Slika 2: *Povprečni stroški po rojenem pujsku med odstavitvijo in uspešnim pripustom v štirih sezonah za kontrolno (levo) in P.G. 600® skupino v EUR*

Table 2: *Costs structure per piglet for control group (C) and P.G. 600® group (E) during four seasons*
Preglednica 2: *Struktura stroškov po rojenem pujsku za kontrolno (C) in P.G. 600® skupino (E) v štirih sezonah*

		spring/pomlad		summer/poletje		autumn/jesen		winter/zima	
	total / skupaj	C	E	C	E	C	E	C	E
feed / krma	0.94	1.01	0.82	0.98	0.76	1.08	1.01	0.96	0.96
sow / svinja	5.11	5.31	4.64	5.41	4.56	5.65	5.46	4.93	5.04
building / zgradba	0.36	0.39	0.31	0.37	0.28	0.42	0.39	0.37	0.37
labour / delo	0.32	0.32	0.26	0.31	0.24	0.35	0.33	0.31	0.31
P.G.600® / P.G.600®	0.18	0.00	0.34	0.00	0.35	0.00	0.36	0.00	0.35
total / skupaj	6.92	7.04	6.36	7.07	6.19	7.51	7.55	6.57	7.02
diff. P-E / raz. P-E			−0.68		−0.88		+0.05		+0.46

treatment with P.G. 600® caused 151 EUR uncovered costs in autumn and 1,537 EUR in winter. The use of P.G. 600® during the whole year improved the efficiency of total farm for 3,249 EUR. The treatment of animals only in spring and summer would reduce the cost for 4.937 EUR.

The total production on the farm is around 65 thousand piglets per year. The estimated turnover of the farm at estimated interval of piglet prices between 42 and 52 EUR per animal is more than 2.7 and less than 3.4 million EUR per year. The financial effect of P.G. 600® in studied conditions was unimportant compared to the turnover of the facility.

4 CONCLUSIONS

The P.G. 600® is often used as oestrus promoter in pigs. The effect of treatment varies from experiment to experiment. This experiment was done on the second litter sows on a well-managed farm with the production of 65 thousand 30 kg piglets per year. The treatment with P.G. 600® increased the production of pigs. Treated sows show tendency to produce on average more piglets per litter, they were pregnant earlier and had higher farrowing rate. The positive effect was unexpectedly found only in spring and summer period, but not in autumn and winter. The financial effect of the treatment with P.G. 600® was positive, but unimportant compared to the turnover of the farm. It seems that the treatment with P.G. 600® on well managed farms is not necessary.

5 ACKNOWLEDGEMENT

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Table 3: *Number of born piglets per season in two groups and reduction of costs due to the treatment with P.G. 600® according to two scenarios*
Preglednica 3: *Število rojenih pujskov za dve skupini v štirih sezonah in zmanjšanje stroškov zaradi uporabe P.G. 600® po dveh scenarijih*

	spring pomlad	summer poletje	autumn jesen	winter zima	total skupaj
born piglets / rojeni pujski					
control group / kontrolna skupina	1,508	1,538	1,486	1,691	6,223
P.G. 600® / P.G. 600®	1,618	1,657	1,533	1,650	6,458
total / skupaj	3,126	3,195	3,019	3,341	12,681
difference (P.G. 600®--control) / razlika (P.G. 600®--kontrola)					
difference per piglet / razlika po pujsku	−0.68	−0.88	0.05	0.46	
total difference / skupna razlika	−2,126	−2,812	151	1,537	−3,249
optimal difference / optimalna razlika	−2,126	−2,812	0	0	−4,937

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