

DERIVING ECONOMIC WEIGHTS BY APPLYING THE PROFIT EQUATION METHOD TO A HYPOTHETICAL HUNGARIAN LARGE WHITE PIG POPULATION

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ABSTRACT

The profit equation method was used in order to derive economic weights on a hypothetical Hungarian Large White pig population. The size of the population was held constant at the number of 100 sows which constructed four equal age categories (12, 18, 24, 30 months of age). Average farrowing interval was supposed to be 6 months, all of the sows were fertilised each year. Conception rate and weaning rate was 85% and 90%, respectively. The average litter size was set to be 10 thus total number of the weaned piglets per year was 1530. After replacement 25 culled sows and 1505 pigs could be sold in every year. Economic weight for number of piglets born was 1.1 EURO. Comparing the economic weight of the born piglet with that of the unit of product it can be concluded that reproductive performance receives strong emphasis in Hungary.

Key words: pig production / pigs / breeds / Hungarian Large White / economics / economic weights / Hungary

IZRAČUN EKONOMSKIH TEŽ Z UPORABO ENAČBE ZA IZRAČUN DOBIČKA PRI HIPOTETIČNI POPULACIJI PRAŠIČEV PASME MADŽARSKI LARGE WHITE

IZVLEČEK

Enačbo za izračun dobička smo uporabili za izračun ekonomskih tež pri hipotetični populaciji prašičev pasme madžarski large white. Velikost populacije je bila stalna pri 100 svinjah, razporejenih v štiri enake starostne skupine (12, 18, 24, 30 mesecev v povprečju). Povprečna doba med prasiatvama je bila po predpostavki 6 mesecev, vse svinje so bile osemenjane vsako leto. Delež uspešnih osemenitev in delež odstavljenih pujskov je bil 85 % oziroma 90 %. Povprečna velikost gnezda naj bi bila 10, tako da je bilo skupno število odstavljenih pujskov na leto 1530. Vsako leto bi lahko po remontu prodali 25 izločenih svinj in 1505 prašičev. Ekonomska teža za število rojenih prašičev je bil 1,1 EURA. Na osnovi primerjave ekonomske teže za število rojenih prašičev in enoto proizvoda lahko zaključimo, da so na Madžarskem reprodukcijske lastnosti zelo pomembne.

Ključne besede: prašičereja / prašiči / pasme / madžarski large white / ekonomika / ekonomske teže / Madžarska

INTRODUCTION

In Hungary, the performance of the pig breeding sector is evaluated through various performance tests. Carcass traits are measured by progeny tests while other production traits and reproductive performance is monitored using performance test. Based on the obtained data, various conventional index scores are created in order to rank the breeding animals. The BLUP method is only used as a supplementary tool helping selection decision. Presently, a multitrait model is applied for estimating breeding values for the production traits and a single trait

(repeatability) model is used for breeding value evaluation of reproduction data expressed only as the number of piglets born alive. Though evaluated separately reproductive performance is considered to have high economic value. Reproductive failure (undetected oestrus, high mortality of piglets, long farrowing interval) is the most common reason for culling the sows. In Hungary, majority the sows are culled after the second, third or fourth parity. Thus only 53–72% of the sows' lifespan can be considered as economically productive. It has to be emphasised that the daily costs are higher for unproductive than the productive period. Hence, it is very likely that the total costs of the produced piglets (per sow) are higher than desirable. This phenomenon has high impact on the profitability of fattening, as the high initial costs of the piglets cannot be compensated during the fattening period.

Perceiving the high economic importance of reproductive performance, the objective of this paper was to estimate economic value for the number of piglet born alive from the perspective of the individual and unit product.

MATERIALS AND METHODS

The method corresponds to the one used by Ponzoni (1988). The profit equation was derived on a hypothetical population with a constant size of 100 Hungarian Large White sows. Four age groups were constructed (12, 18, 24 and 30 months of age) having 25 sows in each group. First farrowing occurred at the age of 12 months. Subsequent parturitions took place in intervals of 6 months. The other production parameters were set to the national average values (Csörnyei., 2003). Fertilisation and farrowing rates were 100% and 85%, respectively. The average number of piglets born and weaned per farrowing was 10 and 9, respectively. Total number of piglets weaned per year was $1.00 \times 0.85 \times 100 \times 18 = 1530$. The needed sow replacement was 25 hence $1530 - 25 = 1505$ pigs plus 25 culled sows could be sold in every year.

Economic weight was calculated adapting the equation given by Brascamp *et al.* (1985). Trait of interest was the number of piglets born per sow per year. Economic weight of this trait was defined from the individuals' and unit product's perspective.

Profit equations: $wr - c_1d - c_2/n^2$; $r - c_1d/w - c_2/wn$

Economic weights: c_2/n^2 ; c_2/n^2w

where:

w = weight of product per retailed animal (weight of pigs at slaughter),

r = (price per unit product),

c₁ = (cost per slaughtering per day),

d = (age at slaughter animal),

c₂ = (cost per sow per year),

n = (number of slaughtered pigs per sow per year).

The annual cost of a sow is 240 EURO (from which annual feeding cost is 160 EURO).

RESULTS AND DISCUSSION

The economic weight for the number of piglets born per sow per year was ($V_{1b} = 240/15.05^2$) 1.1 EURO. The economic weight of one unit product is 80 times less than that of the number of piglets. At least to our best understanding no economic weights were published by other Hungarian authors for the same traits. However, Jelinkova *et al.* (2002) found that the economic weight of the number of piglets was 55 times greater than that of one kg product (440 vs. 8 CZK) so the reproductive performance received more emphasis in Hungary than in the Czech republic.

CONCLUSIONS

Economic weights and ratio that of the number of born piglet and unit of product derived by the present research differed from those described by other authors. However, according to the literature, the overall monetary genetic gain and the total return from selection seem to be relatively robust to deviations from the "true economic weighing" of traits in the breeding objective (Wolfova *et al.*, 2002). The Hungarian pig breeding sector should therefore apply (BLUP and) aggregate genotype instead of the conventional index scores.

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