

C-BAND POLYMORPHISM STUDIES ON SWINE TELOMERIC CHROMOSOMES

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SUMMARY

Frequency and distribution of large centromeric heterochromatin was investigated on swine telomeric chromosomes. Enlarged C-bands were observed in 41% of boars evaluated. Differences between breeds were not significant. In most cases chromosome pair No. 16 showed heterochromatin larger than usual.

INTRODUCTION

Polymorphism of centromeric heterochromatin is a common phenomenon in mammals. Occurrence and inheritance of the C-band size variants was studied by several authors (e.g. Phillips, 1977). There are also investigations towards the potential phenotypic effects of some variants mostly in humans (Jacobs *et al.*, 1975; Atkin and Brito-Babpulle, 1981).

Variability of C-band size in swine chromosomes has also been demonstrated (Hansen-Melander and Melander, 1974; Hansen, 1982). The variants are inherited in a regular Mendelian way (Christensen and Smedegard, 1978; 1979; Switonski *et al.*, 1983).

For future investigations of expected phenotypic effects of such polymorphism boars with pronounced extra centromeric heterochromatin were looked for and discussed in this study.

MATERIAL AND METHODS

Blood samples were taken from boars of different breeds belonging to A.I. stations in Hungary. Lymphocyte cultures were prepared according to the conventional microculture method. The air-dried slides were stained for C-bands by the method of Sumner (1972). Variants were ascertained by scoring 10 metaphase cells. Chromosomes with at least double sized centromeric heterochromatin block were considered to be "+" variants. Evaluation was restricted to telocentric chromosomes (pair Nos 13-18) because of their considerable amount of heterochromatin (metacentrics and submetacentrics show much smaller C-bands and there isn't so significant variation).

RESULTS

The frequency of animals having large heterochromatic block is shown in Table 1.

Table 1 Frequency of boars showing any "+" variant heterochromatin

Breeds	Total	Boars without "+" variant	Boars with one or more "+" variant
Hungarian Large White	28	20 (71%)	8 (29%)
Hungarian Landrace	33	17 (52%)	16 (48%)
Duroc	16	7 (44%)	9 (56%)
Others	16	11 (69%)	5 (31%)
Total	93	55 (59%)	38 (41%)

Distribution of large heterochromatin on telocentric chromosomes is demonstrated in Table 2. Since the chromosome pair Nos 14-15 and 17-18 are difficult to distinguish, these data were grouped.

Table 2 Number of "+" variant C-bands observed on different telocentric chromosomes (Nos 13-18)

Breeds	C h r o m o s o m e s			
	No 13	Nos 14-15	No 16	Nos 17-18
Hungarian Large White	0	2	4	4
Hungarian Landrace	1	3	10	6
Duroc	0	1	4	7
Others	0	1	2	3
Total	1	7	20	20

In some cases more "+" variants were found in one animal. Table 3 shows the simultaneous occurrence of large heterochromatin segments.

Table 3 Frequency of boars showing different numbers of large heterochromatin blocks

Breeds	Number of large heterochromatin blocks			
	0	1	2	3
Hungarian Large White	20	6	2	0
Hungarian Landrace	17	13	2	1
Duroc	7	6	3	0
Others	11	4	1	0
Total	55	29	8	1

DISCUSSION

Almost the half (41%) of the investigated animals carry at least one telocentric chromosome with large heterochromatic segment. Grouped data show remarkable - though not significant - differences between breeds. "+" variants occur most frequently in Duroc (56%) and only in 29% of Hungarian Large White breed.

Generally, smaller telocentric chromosomes show enlarged C-bands (Table 2). Chromosome No. 16 seems to be affected most often.

In the most cases "+" variants appear alone but sometimes, two or three of them occurs simultaneously on different telocentrics (Table 3). It's worth mentioning that we couldn't find large C-bands in homozygous condition.

In some cases (mainly on the chromosome No. 16) heterochromatic region can be so large that the size of the whole chromosome is altered, which is clearly seen even after conventional Giemsa-staining. The structure of this segment can be different. On C-banded prophase chromosomes it seems to be duplicated and divided into two parts by a narrow euchromatic segment. In other cases the enlarged C-bands are stained homogenously.

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