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# Constitutive heterochromatin in pig (*Sus scrofa*) as a tool of chromosomal polymorphism<sup>†</sup>

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**SUMMARY** - The distribution of constitutive heterochromatin (HC= C-bands) was studied in pig chromosomes of two Italian breeds (Calabrese and Cinta Senese). The use of high resolution banding techniques allowed a detailed description of HC-distribution in pig chromosomes which appeared highly polymorphic within and among chromosome pairs.

**Key word:** Pig, chromosome, C-banding, G-banding.

**RESUME** - "Hétérochromatine constitutive du porc (*Sus scrofa*) comme technique d'étude du polymorphisme chromosomique". Dans cette étude on présente la distribution de l'hétérochromatine constitutive (HC= C-bands) dans les chromosomes de porcs appartenant à deux races autochtones italiennes (Calabrese et Cinta Senese). Les techniques des bandes à haute résolution utilisées ont permis d'obtenir une description très détaillée de la distribution de HC dans les chromosomes du porc, aussi bien à l'intérieur qu'entre les paires de chromosomes de tous les animaux étudiés.

**Mots-clés :** Porc, chromosome, bande C, bande G.

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## Introduction

Constitutive heterochromatin (HC= C-banding) is a highly chromosomal polymorphic site which varies within and among the karyotypes of different animals from the same species. However, C-banding patterns are repetitive among cells from the same animal and they are inherited as Mendelian characters. In pig (*Sus scrofa*) all chromosomes have been reported to be C-positive (Sysa, 1980; Glahn-Luft *et al.*, 1982; Hansen, 1982; Lin *et al.*, 1982; Switonski *et al.*, 1983). Furthermore, interstitial C-bands have been found in pig chromosome (SSC) 16 (Glahn-Luft, *et al.*, 1982; Hansen, 1982).

In the present study we report the preliminary results of C-banding pattern distribution in two Italian pig breeds by using high resolution banding techniques.

## Materials and methods

Peripheral blood cells from 10 Italian pigs of Cinta Senese (central Italy) and Calabrese (southern Italy) breeds, raised at the ConsDABI, Circello (BN), were cultured in TC medium and treated for early incorporation of 5-BrdU. This allowed to obtain G-banding patterns. Slides were treated for both CBA-banding (Sumner, 1972 protocol and acridine orange staining) and sequential GBG/CBA-banding. Pig chromosomes were arranged according to the standard karyotype (Gustavsson, 1988).

## Results and discussion

Figure 1 shows a pig male metaphase cell treated for CBA-banding technique. All chromosomes are C-positive. Y chromosome is entirely heterochromatic, with exception of distal part of short p-arm. Furthermore, interstitial positive C-bands were found, for the first time,

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<sup>†</sup>The present study is a part of more extended one in press in the scientific journal "Caryologia".

in SSC1q and SSC3p and confirmed in SSC16 as earlier reported (Glahn-Luft *et al.*, 1982; Hansen, 1982).

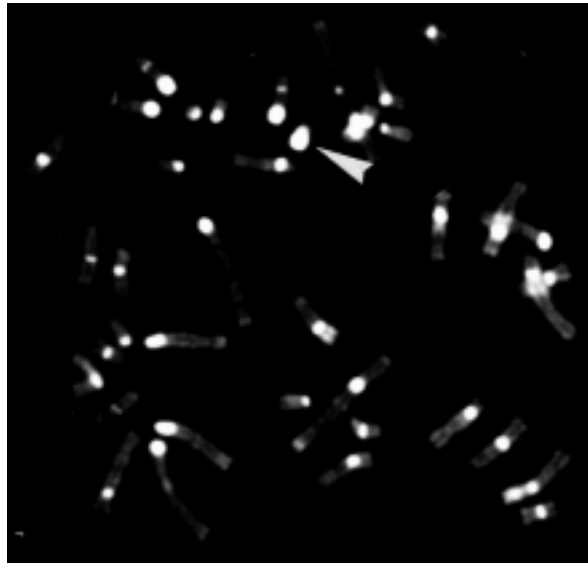


Fig. 1. Male pig metaphase cell (2n=38, XY) treated for CBA-banding technique. Notice that all chromosomes are C-positive and the Y-chromosome is entirely heterochromatic, with the exception of the distal part of the short arms.

The use of sequential GBG/CBA-banding technique (Fig. 2A-B) allowed us: (i) to study the HC-distribution within and among the chromosomal pairs of 10 animals studied; (ii) to establish the position of the interstitial C-bands (SSC1q17, SSC3p14 and SSC16q21); (iii) to check that C-banding pattern is the same in different cells of the same subject; and (iv) to reveal a high degree of chromosomal polymorphism of the HC among the animals also when they were highly related.

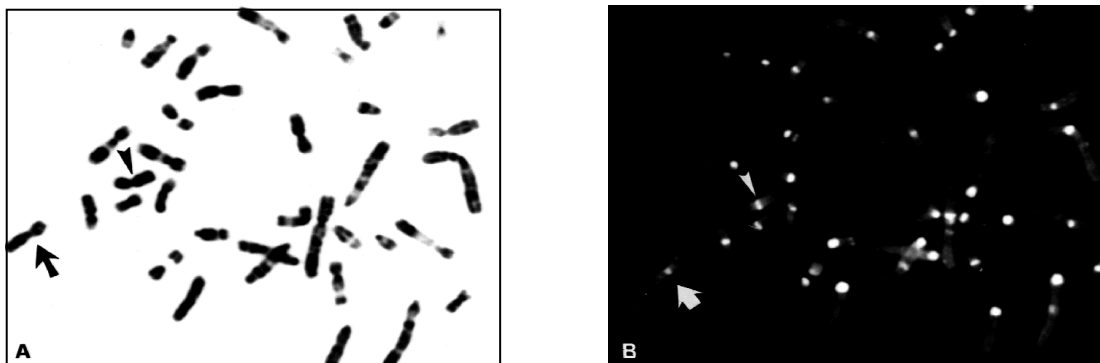


Fig. 2. Female early-metaphase cell (2n=38, XX) treated for sequential GBG (A) and CBA (B) banding techniques. Active (large arrow) and inactive (small arrow) X-chromosomes are indicated.

## Conclusion

The HC-polymorphism may be a good tool to study the animal biodiversity, especially in pig where it should be possible to establish possible positive correlation between a particular HC-distribution and the animal productions (quantity and quality).

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