

CHROMOSOME INVESTIGATIONS OF BULLS IN HUNGARY

INVESTIGACIONES CROMOSÓMICAS EN TOROS DE HUNGRÍA

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Additional keywords

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Palabras clave adicionales

Anomalías cromosómicas. Ganado vacuno.

SUMMARY

A.I. bulls are routinely checked since 1975, later some young bulls and Hungarian Grey sires used for natural service became investigated as well. 3697 animals of 13 breeds and different crosses (2288 Holstein Friesian, 770 Simmental, 196 Hungarian Grey, 76 Limousin, 62 Hereford, 50 Charolais, 16 European Red and White, 11 Blonde d'Aquitaine, 10 Jersey, 7 SMR, 6 Lincoln Red, 2 Kostroma, 1 Swedish Friesian and 202 crossbred bulls) have been evaluated. Two hereditary centric fusions were found: the 1;29 in 25 Simmental (3.25 p.cent), 10 Hungarian Grey (5.10 p.cent), 1 Charolais (2.00 p.cent), 2 Blonde d'Aquitaine (18.18 p.cent) and in one Holstein-Friesian x Simmental crossbred (0.50 p. cent) and the 14;21 in a single Simmental (0.13 p. cent) bull. Two mosaic cases, a 5;18 centric fusion in a Simmental (0.13 p. cent) and an abnormality described as 13;21 centric fusion in a Holstein-Friesian bull (0.04 p. cent), were not found among the offspring. XX/XY chimaerism was detected in 69 Holstein-Friesian (3.02 p. cent), 9 Simmental (1.17 p. cent), 1 Limousin (1.32 p. cent), and in 4 crossbred (1.98 p. cent) bulls; a single case of XY/XXY chimaerism was found in a Holstein-Friesian (0.04 p. cent). As a result of culling the carriers of hereditary abnormalities since 1975, the number of cases of the 1;29 translocation is decreasing.

RESUMEN

Los toros de inseminación artificial son analizados sistemáticamente desde 1975, posteriormente, también han sido investigados toros jóvenes y machos de la raza Hungarian Grey. Han sido evaluados 3.697 animales de 13 razas y distintos cruces (2.288 Holstein Friesian, 770 Simmental, 196 Hungarian Grey, 76 Limousin, 62 Hereford, 50 Charolais, 16 European Red y White, 11 Blonde d'Aquitaine, 10 Jersey, 7 SMR, 6 Lincoln Red, 2 Kostroma, 1 Swedish Friesian y 202 toros cruzados). Se encontraron dos fusiones céntricas hereditarias: la 1;29 en 25 Simmental (3,25 p. cien), 10 Hungarian Grey (5,10 p. cien), 1 Charolais (2,00 p. cien), 2 Blonde d'Aquitaine (18,18 p. cien) y en un cruzado Holstein-Friesian x Simmental (0,50 p. cien), y la 14;21 en un solo toro Simmental (0,13 p. cien). Dos casos de mosaicos, una fusión céntrica 5;18 en Simmental (0,13 p. cien) y una anomalía descrita como fusión céntrica 13;21 en un toro Holstein-Friesian (0,04 p. cien), no fueron detectados entre la descendencia. Se detectó quimerismo XX/XY en 69 toros Holstein-Friesian (3,02 p. cien), 9 Simmental (1,17 p. cien), 1 Limousin (1,32 p. cien) y en cuatro toros cruzados (1,98 p. cien); un solo caso de quimerismo XX/XXY ha sido encontrado en un Holstein-Friesian (0,04 p. cien). Como resultado de la eliminación sistemática de los portadores de

anomalías hereditarias desde 1975 el número de casos de translocación 1;29 está disminuyendo.

INTRODUCTION

The lower fertility of carriers of the 1;29 translocation reported by Gustavsson (1969) resulted in the introduction of cytogenetic screening of A.I. bulls in different countries. In Hungary cattle chromosome investigations started already in the sixties by I. Horváth checking 12 cattle of normal karyotype, not publishing his results. We investigated the first bulls collaborating with a human lab lead by M. Sellyei in 1972.

MATERIAL AND METHODS

A.I. bulls are routinely checked from peripheral blood-cultures since 1975,

later some young bulls and Hungarian Grey sires used for natural service became investigated as well. 3697 bulls of 13 breeds and different crosses have been evaluated.

RESULTS AND DISCUSSION

Four kind of centric fusions have been described: the 1;29 in the Simmental, Hungarian Grey, Charolais and Blonde d'Aquitaine breeds and in one Holstein x Simmental crossbred (Kovács and Szepeshelyi 1987); the 5;18 in a Simmental (Papp and Kovács 1980, the 13;21 in a Holstein (Kovács *et al.*, 1973), and the 14;21 in a Simmental bull (Kovács 1975). The 5;18 and 13;21 centric fusions occurred in mosaic form. XX/XY chimaerism was found among Holstein, Simmental, Limousin and crossbred bulls, XY/XXY in a Holstein bull (Kovács and

Table I. Karyotypes of bulls of different breeds. (Cariotipos de toros de diferentes razas).

Breed	N	60 XY (p.cent)	1;29t (p.cent)	5;18t (p.cent)	13;21 (p.cent)	14;21t (p.cent)	XX/XY (p.cent)	XY/XXY (p.cent)
Holstein	2288	2217 (96.90)	-	-	1 (0.04)	-	69 (3.02)	1 (0.04)
Simmental	770	734 (95.32)	25 (3.25)	1 (0.13)	-	1 (0.13)	9 (1.17)	-
Hungarian Grey	196	186 (94.90)	10 (5.10)	-	-	-	-	-
Limousin	76	75 (98.68)	-	-	-	-	1 (1.32)	-
Hereford	62	62 (100.00)	-	-	-	-	-	-
Charolais	50	49 (98.00)	1 (2.00)	-	-	-	-	-
Eur. Red and White	16	16 (100.00)	-	-	-	-	-	-
Blonde d'Aquitaine	11	9 (81.82)	2 (18.18)	-	-	-	-	-
Jersey	10	10 (100.00)	-	-	-	-	-	-
SMR	7	7 (100.00)	-	-	-	-	-	-
Lincoln Red	6	6 (100.00)	-	-	-	-	-	-
Kostroma	2	2 (100.00)	-	-	-	-	-	-
Swedish Friesian	1	1 (100.00)	-	-	-	-	-	-
Crossbred	202	197 (97.52)	1 (0.50)	-	-	-	4 (1.98)	-
All	3697	3571 (96.59)	39 (1.05)	1 (0.03)	1 (0.03)	1 (0.03)	83 (2.24)	1 (0.03)

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Szepeshelyi 1987). Results are summarised in **table I**.

The 1;29 and 14;21 centric fusions were inherited, the 5;18 and 13;21 ones were not found among the offspring. Chimaerism was more common among Holstein bulls, probably in connection with the higher twinning rate in this breed. A.I. bulls carrying hereditary chromosome abnormalities are culled together with their frozen semen doses

since 1975, resulting in a decreasing frequency of carriers.

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