

RESULTS OF GENETIC IMPROVEMENT IN THE ITALIAN HEAVY DRAUGHT HORSE (IHDH)

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SELECTION

GENERAL:

- Stud book management: relationships data among animals
- Data Recording for traits under selection
- Genetic evaluation for traits under selection
- Access to Stud Book and controlled use of animals in reproduction programmes

SPECIFIC FOR IHDH:

- Recording of newborn foals and DNA Proof
- Yearly linear type trait evaluation of foals aged 2-7 months
- Genetic indexes for linear type traits
- Specific Criteria for access to Stud Book of Foals, Stallions and French Breton Stallion and regulation for use in AI



ITALIAN HEAVY DRAUGHT HORSE BREEDERS ASSOCIATION

Chart for linear type evaluation of foals & mares

Date: ___/___/___ Foal name: _____ Sex: _____ Birth date: ___/___/___

Sire: Name _____ HB id _____ Mare: Name _____ HB id _____

Calving ease: 0 1 2 3

Mating: N W A
Natural Assisted Wild Artificial Insemination

Farmer: _____ ID Code: _____

Coat of Foal: _____

Condition Score of Mare: LEAN MEDIUM FAT

LINEAR TYPE TRAIT EVALUATION		Foal	Mare
1	Head size and Expression		
2	Blood		
3	Frame size		
4	Fleshiness		
5	Bone incidence		
6	Thorax depth		
7	Fore diameters		
8	Rear diameters		
9	Length of upper line		
10	Direction of upper line		
11	Legs side view		
12	Fore feet		
13	Rear feet		
14	Hind legs back view		

FINAL MORPHOLOGICAL SCORE

F F+ G VG E
Fair Fair + Good Very Good Excellent

SELECTIVE JUDGEMENT K D

Notes and/or cause for no-admission to herd book

CLASSIFIER: _____ ID no. _____

OBJECTIVES

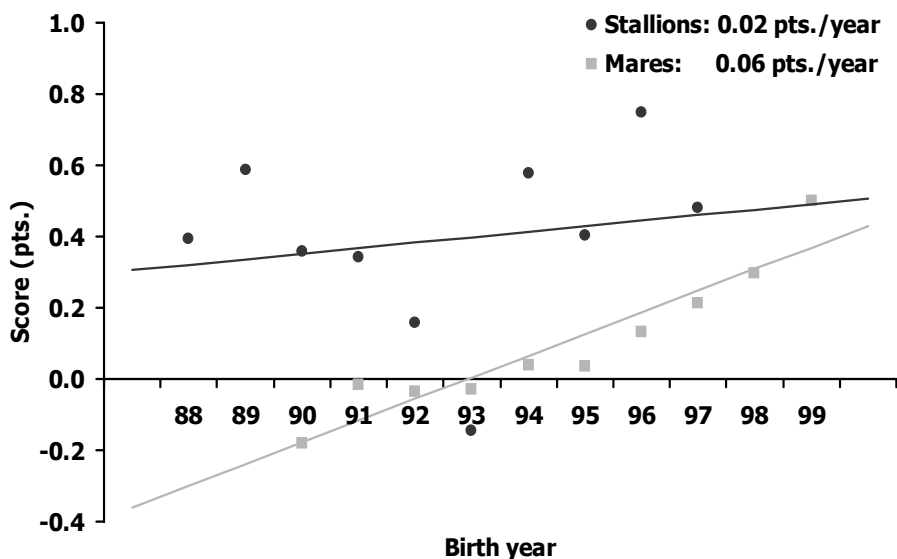
Efficiency evaluation of the selection programme employed for the IHDH in terms of:

- Genetic trend for the main traits under selection (blood trait and fleshiness)
- Generation intervals in Sire of Sires and Dam of Dams Pathways
- Inbreeding rate through generation

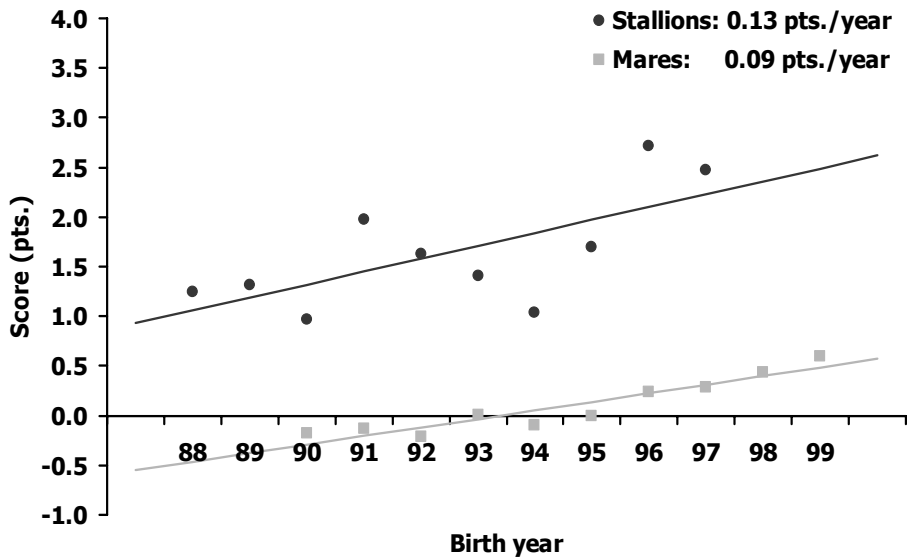
MATERIALS AND METHODS

- Genetic indexes for Blood and Fleshiness obtained for 7414 foals evaluated from 1993 to 2002 and for 2054 mares and 109 stallions
Genetic gain using a linear regression method
- Pedigree information of 39299 horses recorded in the stud book
To calculate generation interval within sire of sire and dam of dam pathways
- Estimation of individual inbreeding for 29447 animals
Trend of inbreeding through generations

GENETIC TREND FOR LINEAR SCORE OF BLOOD TRAIT



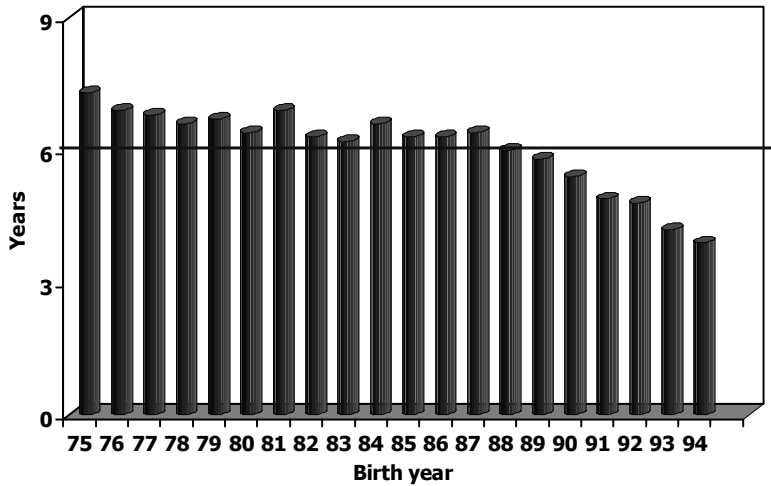
GENETIC TREND FOR LINEAR SCORE OF FLESHINESS



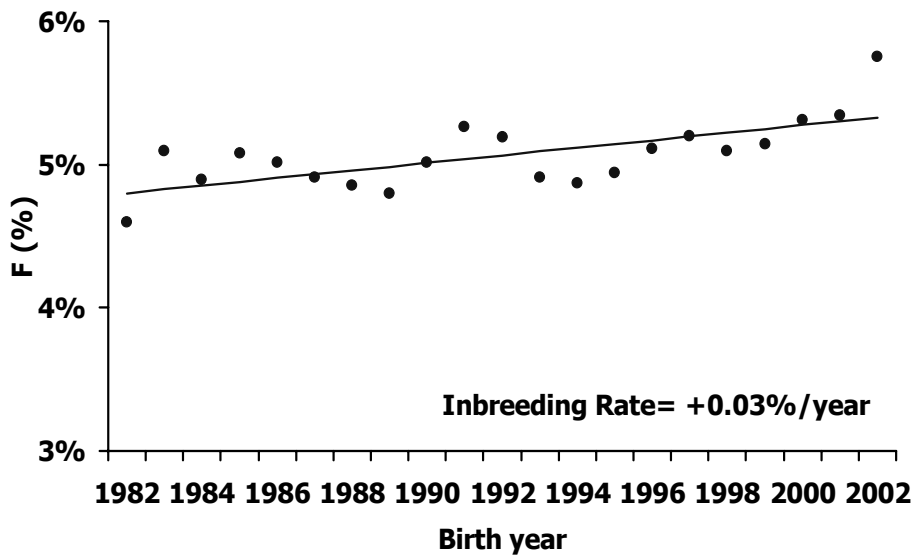
TREND OF GENERATION INTERVAL FOR SIRE OF SIRE

Birth Year	No. Stallions	Sons/ Stallion	Mean	s.d.	Min.	Max.
1975-1979	25	3.0	8.0	3.3	4.0	17.2
1980-1984	47	3.8	6.9	2.6	3.9	13.2
1985-1989	32	2.8	5.8	1.9	3.1	10.9
1990-1994	21	1.6	4.6	1.1	2.9	7.1
Overall	125	3.0	6.5	2.6	2.9	17.2

TREND OF GENERATION INTERVAL FOR DAM OF DAMS



TREND FOR INBREEDING



INBREEDING BETWEEN IHDH AND IMPORTED FRENCH BRETONS

F Range	IHDH		BRETONS	
	No.	%	No.	%
$0 \leq F < 6.25$	4600	94.5%	27	84.4%
$6.25 \leq F < 12.5$	191	3.9%	2	6.3%
$12.5 \leq F < 18.75$	41	0.8%	3	9.4%
$\geq F 18.75$	36	0.7%	0	0.0%
Totale	4868	100.0%	32	100.0%

INBREEDING THE POPULATION FROM IHDH OR FROM FRENCH BRETON STALLIONS

	IHDH	BRETON
Stallions	93	40
Sons become "Stallions"	168	226
F of sons "Stallions"	4.35%	2.90%
Nice and nephews (M & F)	5412	9303
F of Nice and Nephews	5.09%	4.16%

CONCLUSIONS

The selection programme employed for IHDH in about a decade of time has led to:

- **High genetic gain for FLESHINESS, particularly in the stallions**
- **Slower genetic gain for stallion than for mares as regard the BLOOD trait**
- **Progressive reduction of the generation intervals in both sires of sires and dam of dams pathways**
- **A general low annual increase in the inbreeding rate, despite the reduced population size**