



Adding value to data emanating from routine animal recording processes

Charl Hunlun

SA Stud Book and Animal Improvement Association, Bloemfontein, South Africa

Basic animal recording

- ▶ Animal ID
- ▶ Birth date
- ▶ Parent ID's
- ▶ Breeder/Owner



Herdbook registrations

Additional information from the same data allow breeders / breeders' organisations to make better decisions / more genetic progress

Demographic information

▶ Administrative records

- Births
- Deaths
- Cancellations
- Ownership



Size

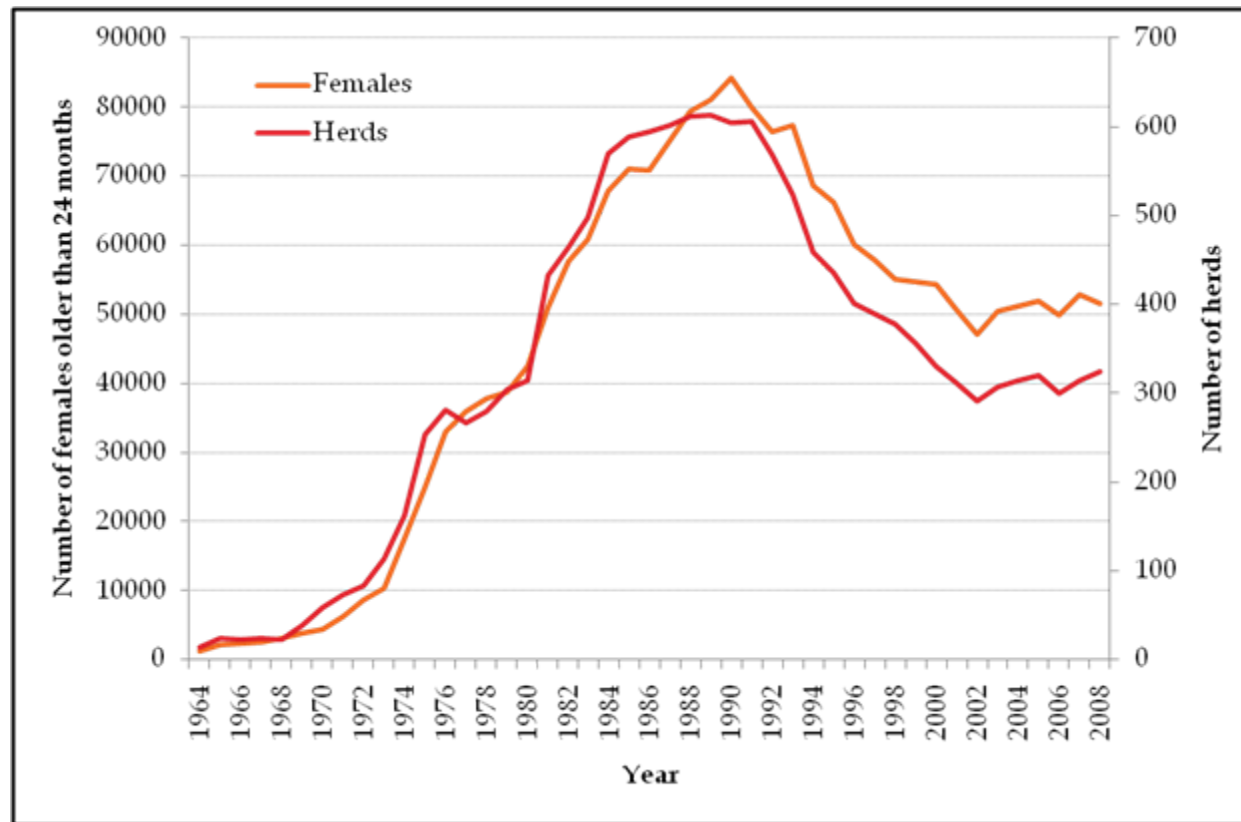
Composition

Spatial distribution

Changes in above

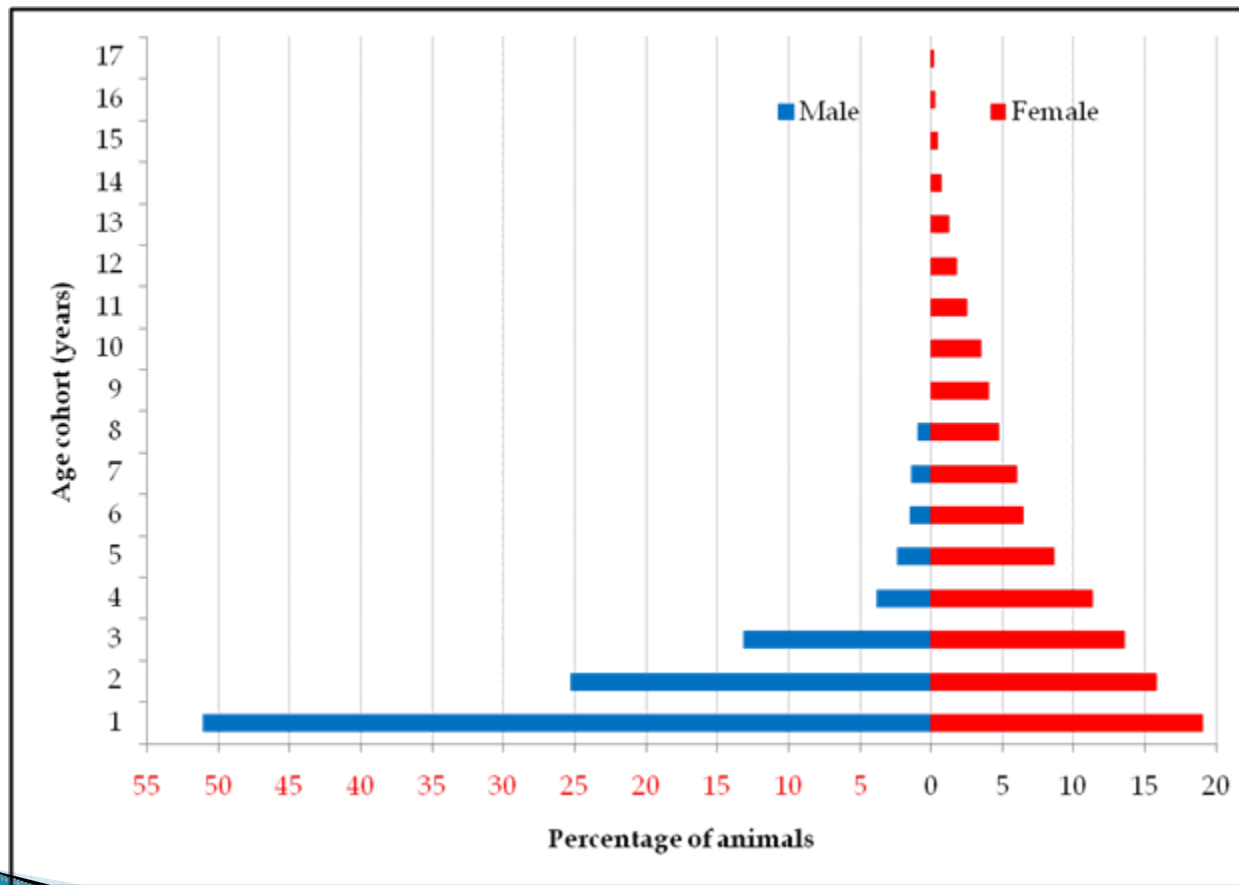
Demographic analysis – Bonsmara

► Population change



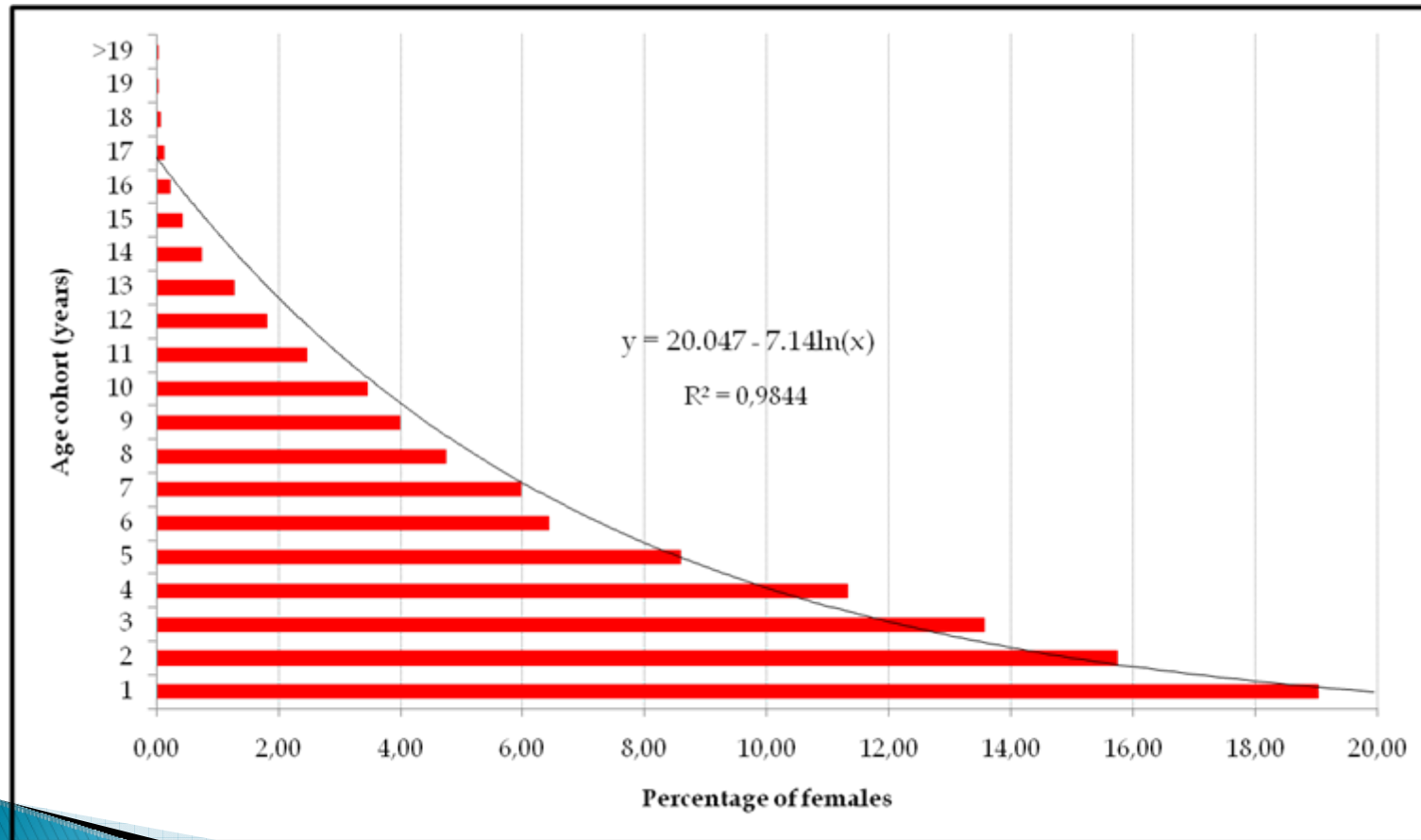
Demographic analysis – Bonsmara

► Population composition



Demographic analysis – Bonsmara

► Population composition - females



Demographic analysis – Bonsmara

► Distribution of recording status - July 2008

	Male	Female
Number of animals	27 319	77 320
Registration Pending (%)	14.12	3.50
Foundation (%)	-	4.90
Appendix A (%)	-	14.38
Appendix B (%)	11.61	12.11
Studbook Proper (%)	74.24	65.11

Demographic analysis – Bonsmara

- ▶ Number of herds, calves born per year, parents, effective population size (N_e) and generation interval (L)

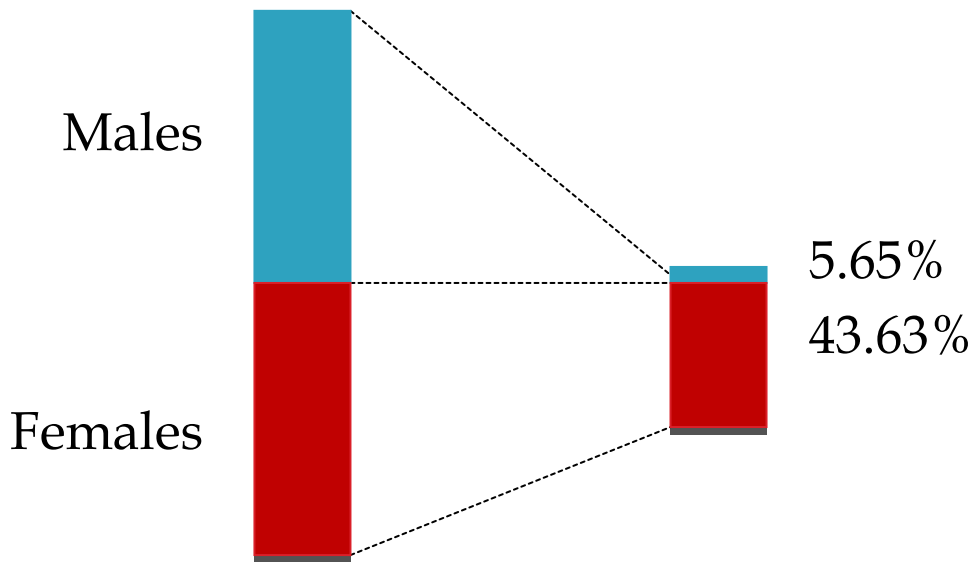
Year	Herds	Calves born	Male calves	Female calves	Dams	Sires	N_e [■]	L
1972/73	42	551	152	399	281	92	277	4.34
1977/78	213	4881	794	4087	3662	572	1979	5.01
1982/83	405	17608	3604	14004	17244	1313	4880	5.67
1987/88	514	30332	9109	21223	30024	1848	6963	5.65
1992/93	462	35288	13476	21812	34892	1958	7416	5.57
1997/98	353	32149	13792	18357	31411	1742	6602	5.67
2002/03	296	28476	13119	15357	27861	1577	5970	5.61
2007/08	282	25138	12156	12982	24859	1433	5420	-

■ $N_e = 4MF / (M+F)$



Demographic analysis – Bonsmara

► Proportion retained



Pedigree information

Pedigree data

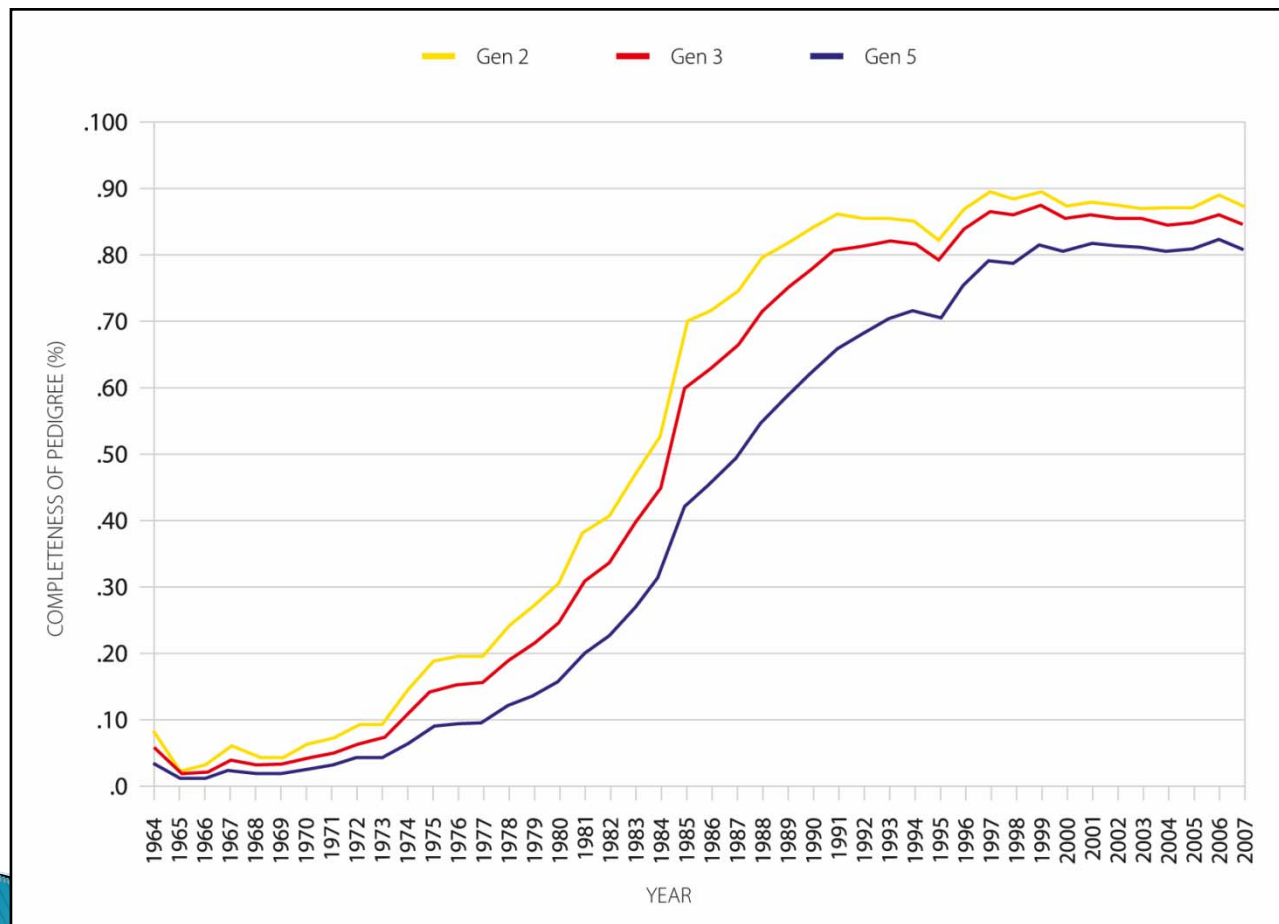


Genetic variability
Genetic progress



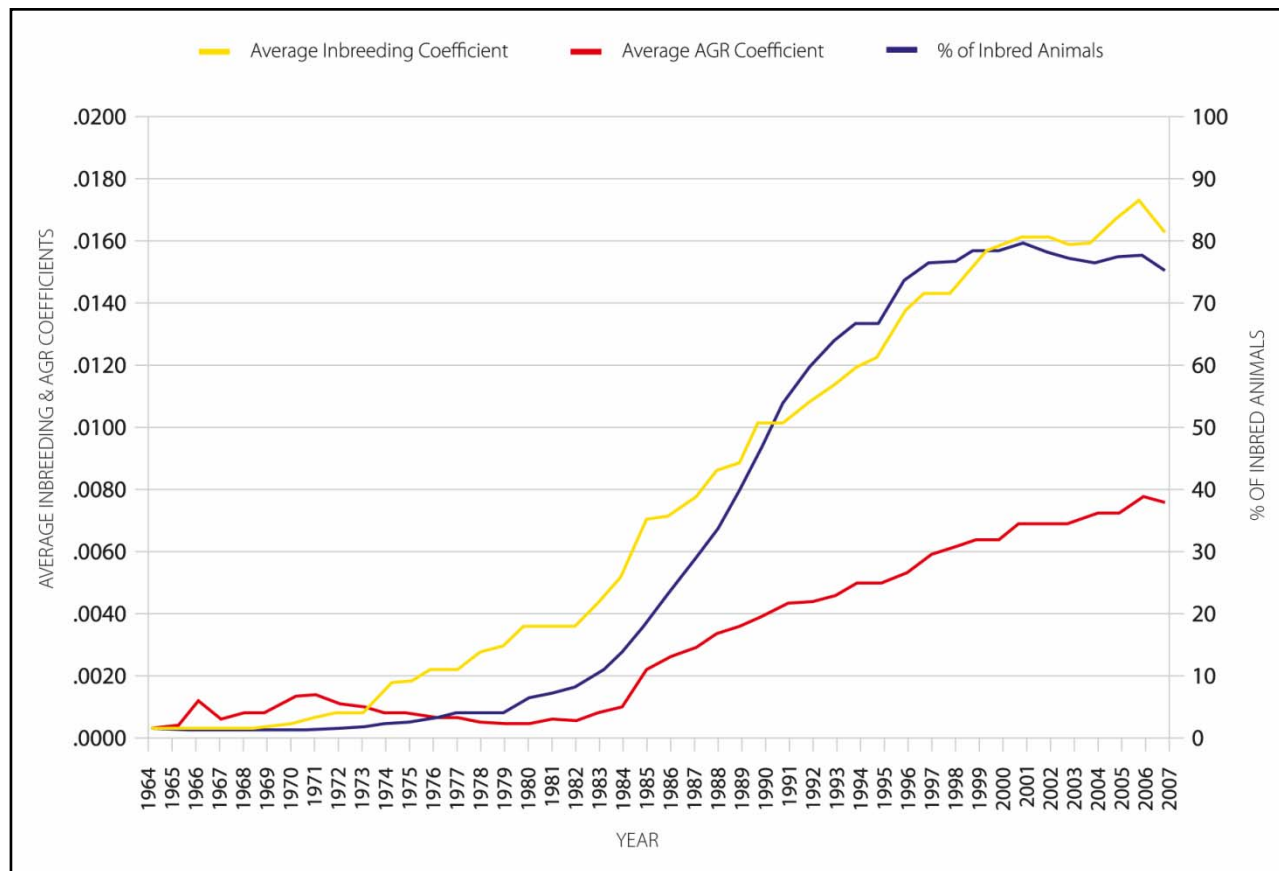
Pedigree analysis – Bonsmara

► Completeness of pedigrees



Pedigree analysis – Bonsmara

► Inbreeding and relationships



Pedigree analysis – Bonsmara

- ▶ Effective population size

$$N_e = 1 / (2 \Delta F)$$

$$\Delta F_{\text{Bonsmara}} = 0.0029 \text{ per generation (0.29\%)}$$

$$N_e = 172$$

Pedigree analysis – Bonsmara

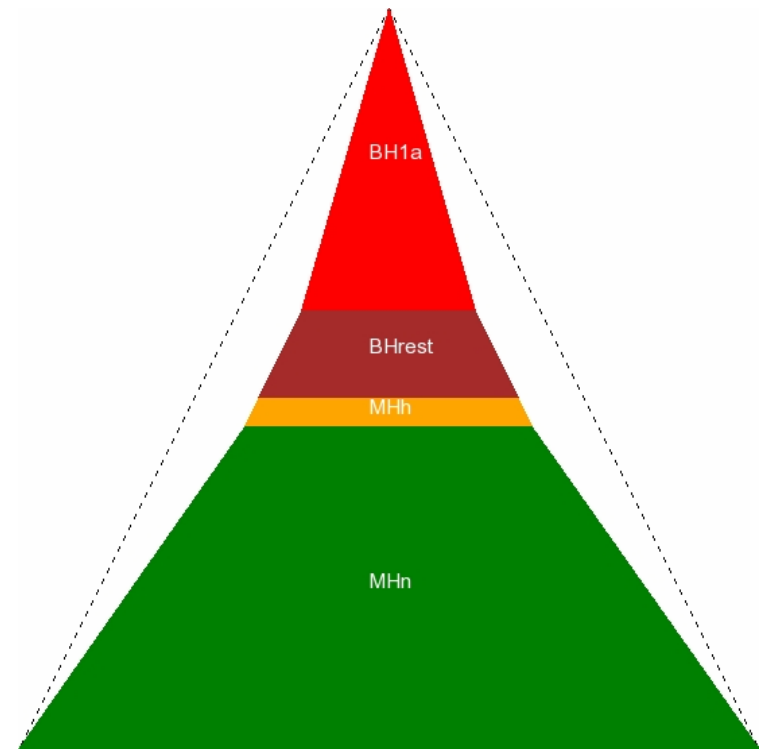
► Breeding structure

Breeders
Multipliers

1976 - 1978	
% Herds	% Calves
35.2	52.7
64.8	47.3
Herds	Calves
176	4064
H _s	H _{ss}
17.45	19.38

Herds each supplying more than 1% of the breed's genetic make-up

1976 - 1978	%
Herd supplying most	9.26
Herd supplying 2 nd -most	7.61
Ave. of 11 other herds	2.22
13	41.3



Breeding structure for the Bonsmara breed – 1976/78.



Pedigree analysis – Bonsmara

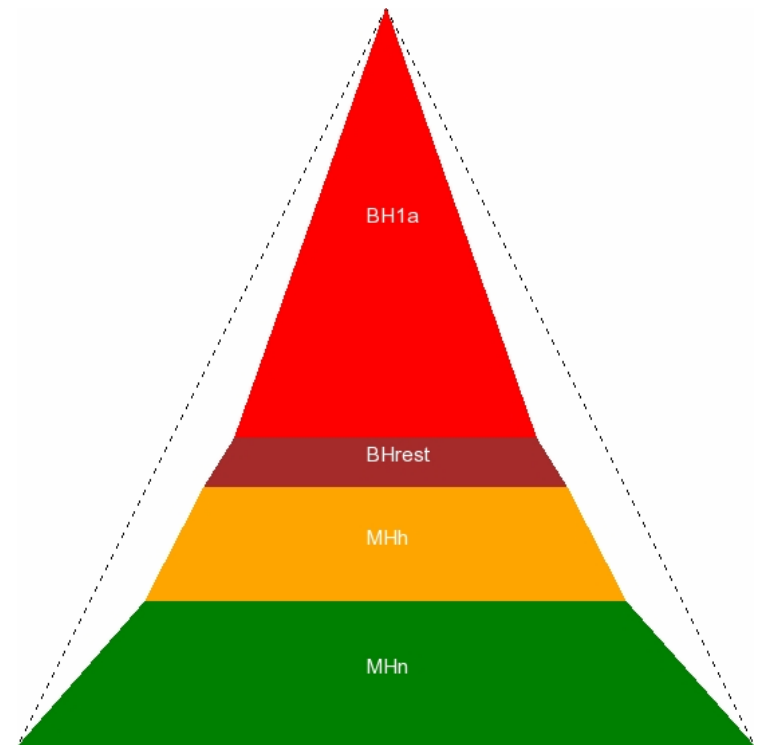
► Breeding structure

Breeders
Multipliers

2006 - 2008	
% Herds	% Calves
49.2	64.9
50.8	35.1
Herds	Calves
250	24844
H_s	H_{ss}
52.63	22.37

Herds each supplying more than 1% of the breed's genetic make-up

2006 - 2008	%
Herd supplying most	5.37
Herd supplying 2 nd -most	3.07
Ave. of 14 other herds	1.57
16	30.4



Breeding structure for the Bonsmara breed – 2006/08.



Pedigree analysis – Bonsmara

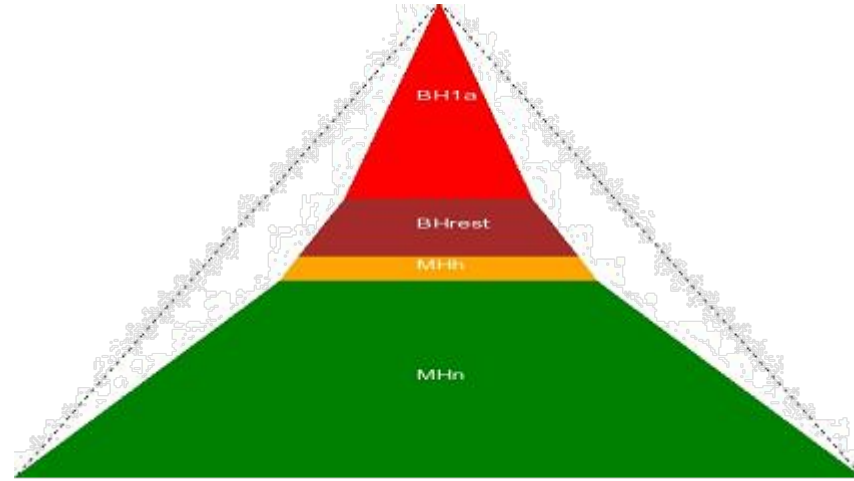
- ▶ Breeding structure



1976 - 1978

Pedigree analysis – Bonsmara

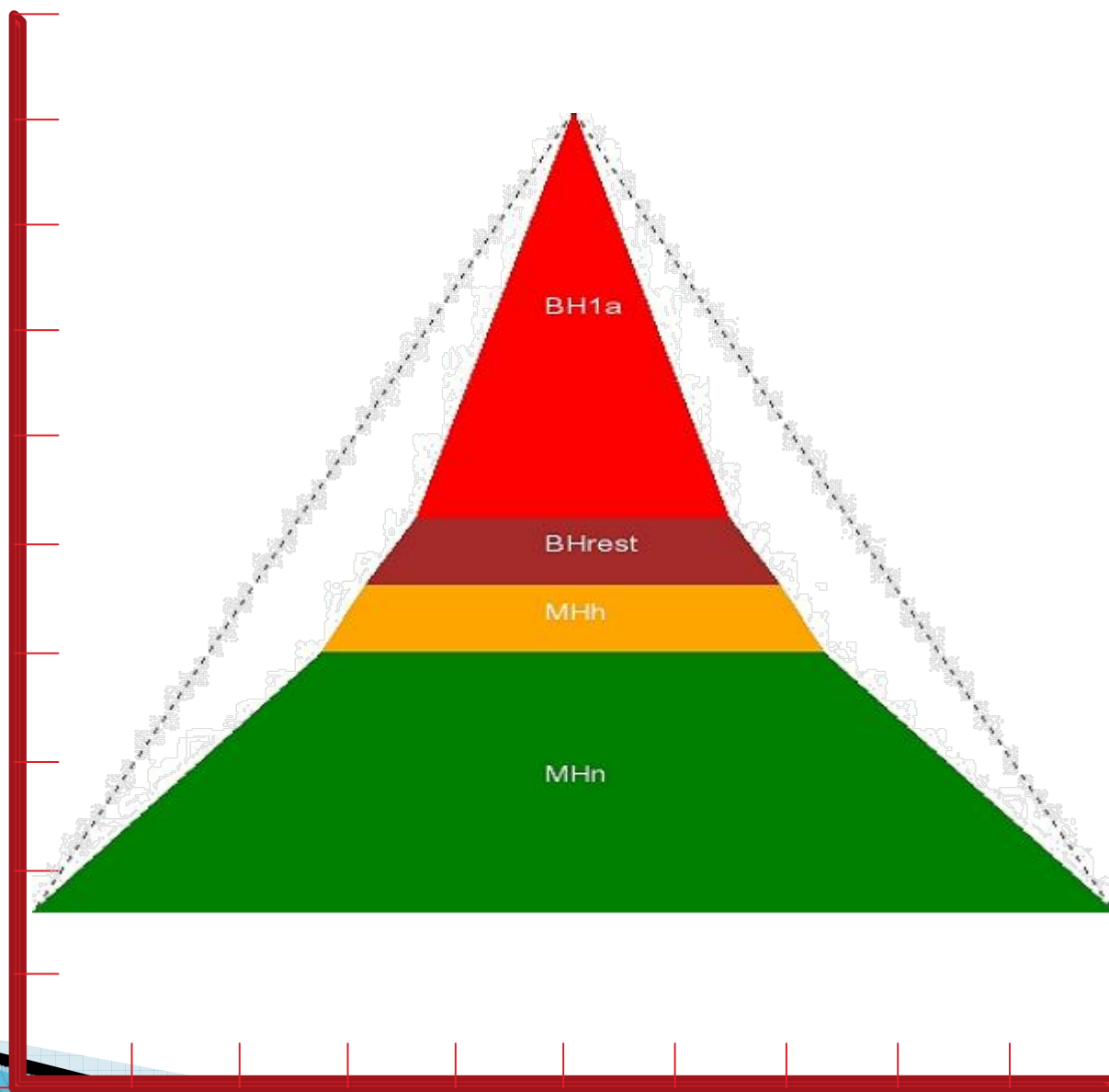
▶ Breeding structure



1981 - 1983

Pedigree analysis – Bonsmara

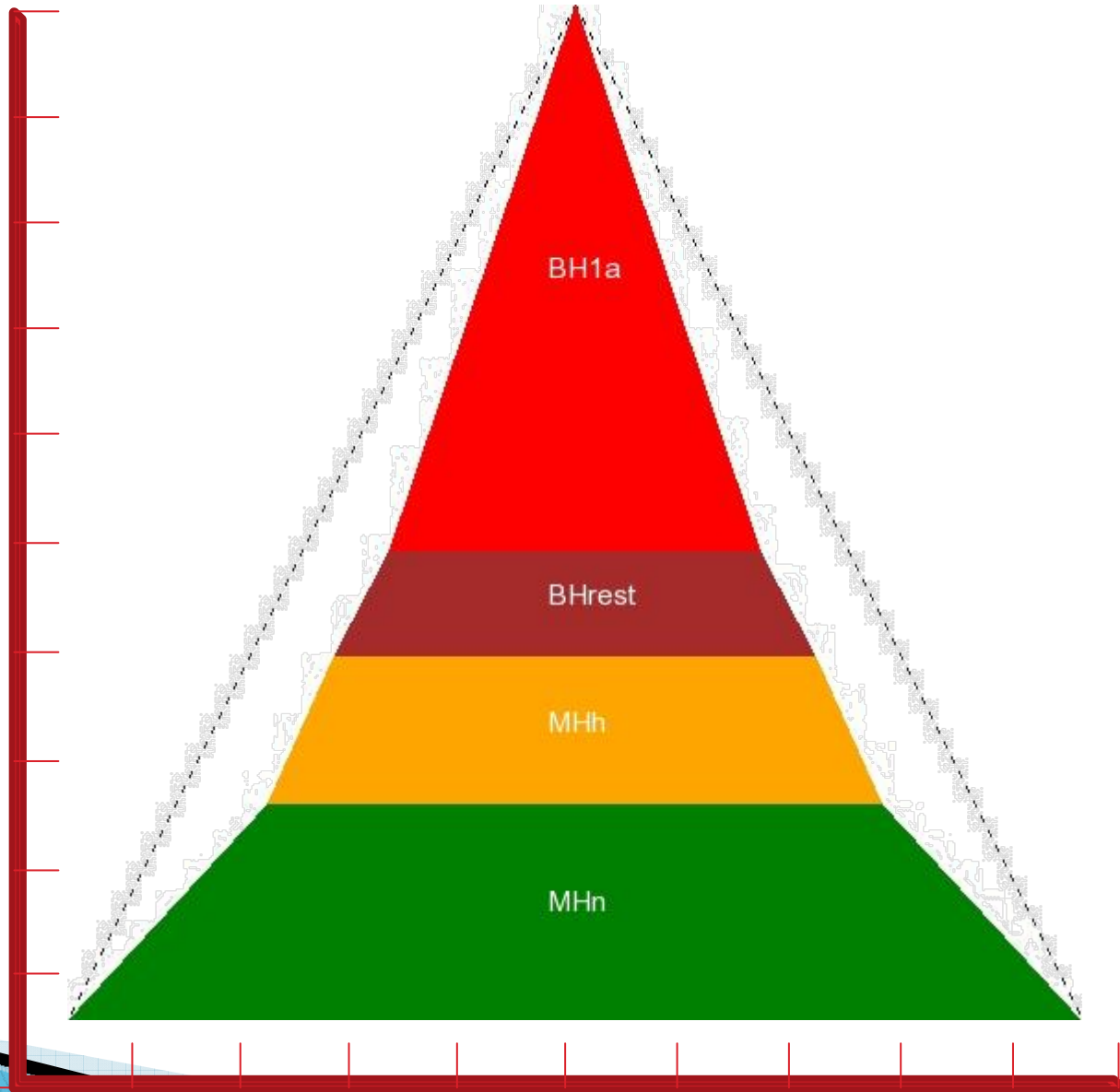
- ▶ Breeding structure



1986 - 1988

Pedigree analysis – Bonsmara

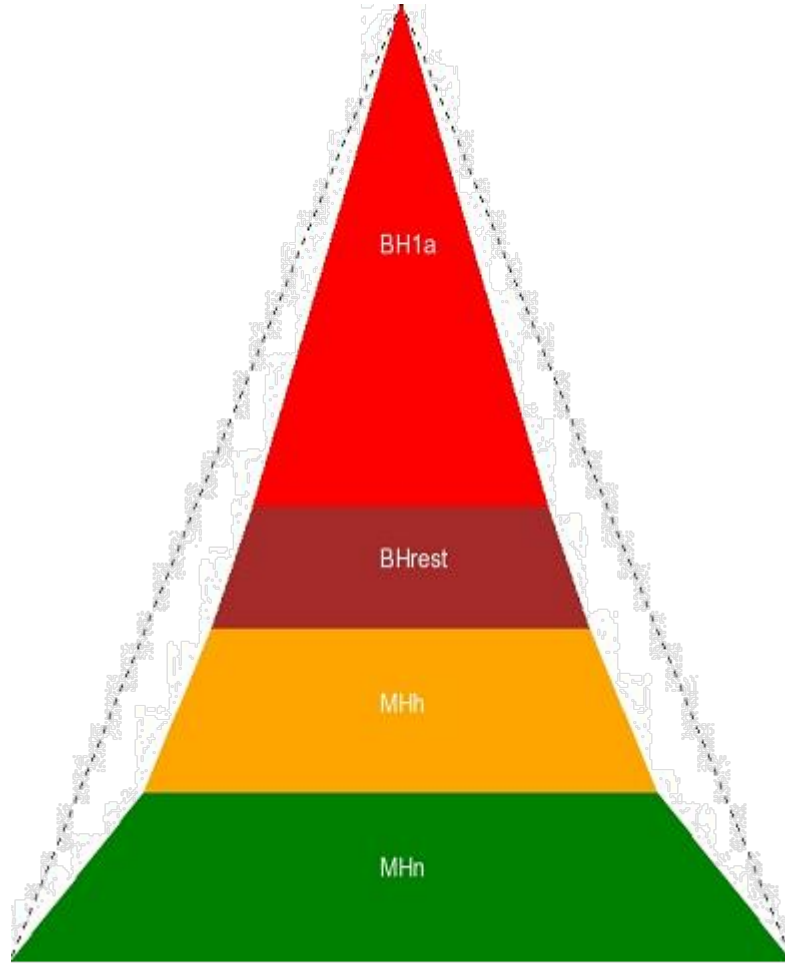
► Breeding structure



1991 - 1993

Pedigree analysis – Bonsmara

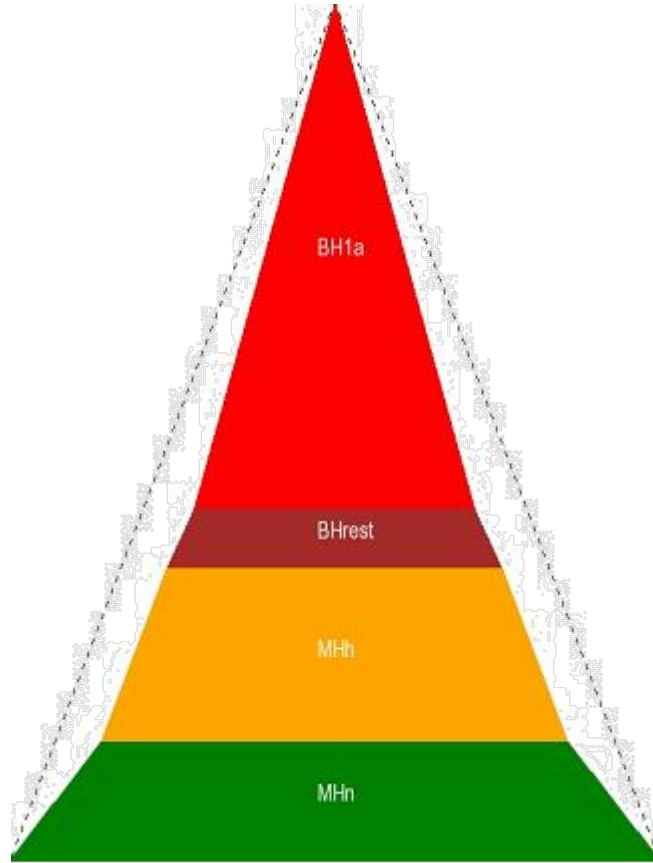
► Breeding structure



1996 - 1998

Pedigree analysis – Bonsmara

► Breeding structure

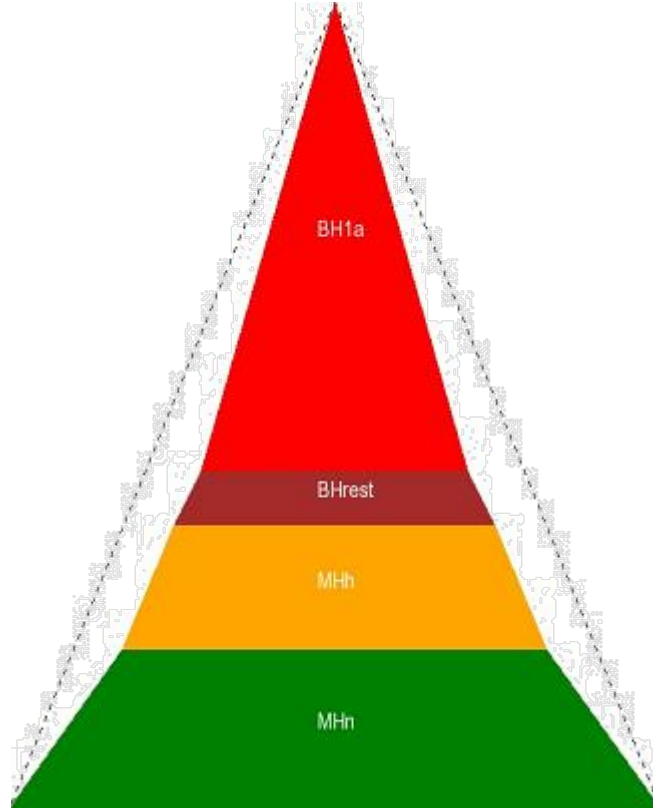


2001 - 2003



Pedigree analysis – Bonsmara

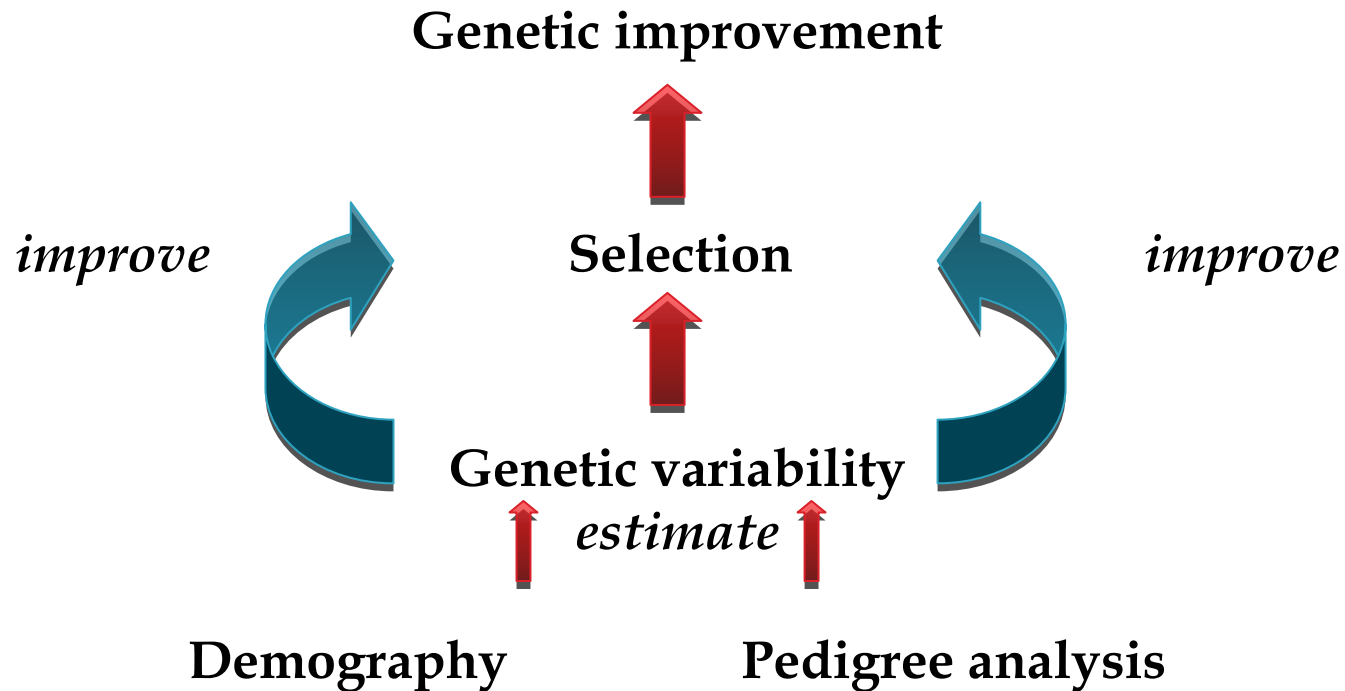
► Breeding structure



2006 - 2008



Conclusive remarks



Relevant strategies / good decisions in terms of genetic improvement can only be made after an in depth analysis of the pedigrees and demographic parameters of a population