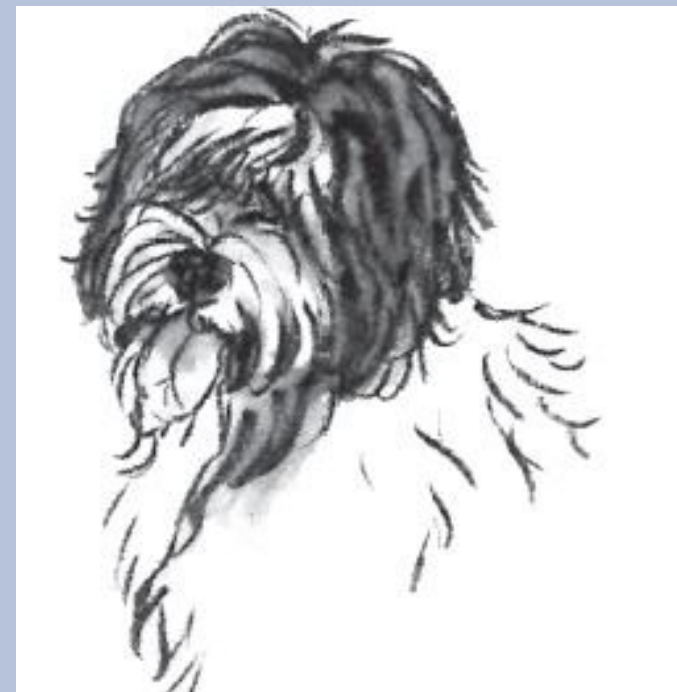




Schapendoes breeding 2022



About me – Marjolein Flobbe

- 2010: First Schapendoes; 4 in total, currently I have 2 males used in breeding (4 litters each).
- 2018: Secretary Vereniging de Nederlandse Schapendoes, board representative in VNS Breeding Committee and Population Management Committee
- 2019: FCI judge Schapendoes. Followed later by Polski Owczarek Nizinny, Saarlooswolfdog. Next exam for Beauceron (Berger de Beauce) in April. Briard (Berger de Brie) to be done.
- 2021: Secretary International Schapendoes Federation
- 2022: President Doesdata Supervisory Board
- 2022: Judge in Outcross Selection Committee AVLS (Breedclub Saarlooswolfdog)
- 2022: Graduated at Wageningen University & Research: Animal Breeding and Genetics – Evaluating Breeding Programmes.



Experience: AVLS – Outcross



- Started in 2012, first plan presented in May: 26 pages plan for breeding strategy from 2012 tot 2025.
- Updated plan in October 2020, based on experience first 8 yrs.
- 18 litters bred, +100 pups in F1, F2, F3. First descendants now receive full pedigrees again (4th generation).
- Outcross with: Norwegian Elkhound, Podenco Ibicenco, Northern Inuit Dog, Working Husky, Swiss Sheperd, American Wolfdog
- Selection Committee: 2 representatives of the Breed Club, 2 representatives of the Dutch Kennelclub, 1 FCI exterior judge
- Selection Committee suggest the breed to cross with. Select the partner of that breed. Evaluate the pups at 8 weeks, at 18 months and 24 months. Committee decides which pups will go into breeding.
- Lookalike Saarlooswolfdogs can also be evaluated and approved for breeding

Monitor our population: why?

Genetic diversity is important:

Genetic diversity helps maintain the health and vigor of a population to resist infectious diseases, pests and other stresses. And it better equips a species to survive in a changing environment.

Scientifically proven! Not something we made up.



Signs to watch out for:

- Damaged DNA: more (hereditary) diseases
- Fertility problems
- Inbreeding depression, known as “an unspecific decrease of fitness,” drastically reduces the quality of an inbred dog’s life, leading to higher incidents of mortality in puppies and shortened lifespans due to a weakened immune system. Common health issues include neurological conditions, skin problems, gastrointestinal matters, joint problems such as hip dysplasia, double P’s in dentition.
- Aggression
- Anxiety



Relatedness/Kinship

- Kinship indicates the extent to which two animals are genetically similar. When two parent animals have children, they each pass 50% of their genes to the young animal. Thus, the animal is 50% related to its father and 50% related to its mother. The percentages below apply if the parents are not related to each other. If they are, the percentages are higher:



Relatedness = Equal Genes

Identical twins:	100%
Full brothers and sisters:	50%
Animal and parent:	50%
Half-brothers and half-sisters:	25%
"Double" cousin or niece:	25%
"Single" cousin or niece:	12.5%
Animal and great-grandparent:	12.5%
No family relationship:	0%



What can we check & compare via Doesdata:

- Mean Kinship Average of the entire population: 29,26%

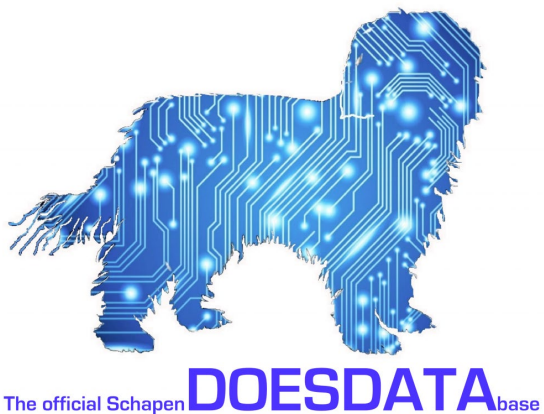
Mean kinship (MK) represents the average kinship of an animal relative to the entire population.

The MK value is a measure of the contribution an animal can make to changing the average inbreeding rate of the population.

A high MK value indicates a high degree of relatedness to the other animals in the population, thus increasing the likelihood of genetic defects and diseases developing within a breed.

If enough animals with a low MK value relative to the average of a population remain available, the more hereditary defects can be prevented.

Therefore, it is important to create combinations in which every animal has a low MK value, is free of diseases and which have a low relationship to each other.



What can we check & compare via Doesdata:

- Ancestor Loss

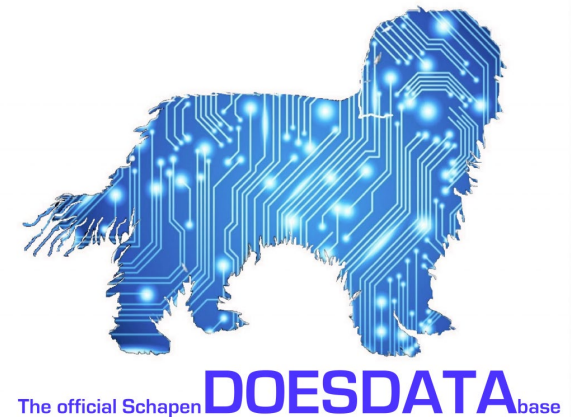
Average of the entire population: 93%

AVK is a German term. It means AhnenVerlust-Koeffizient, or Ancestry Loss. We look at how many ancestors appear twice in a five-generation family tree. If every ancestor is unique, then the AVK is 100%. But has there been linebreeding in the past, then the value is lower.

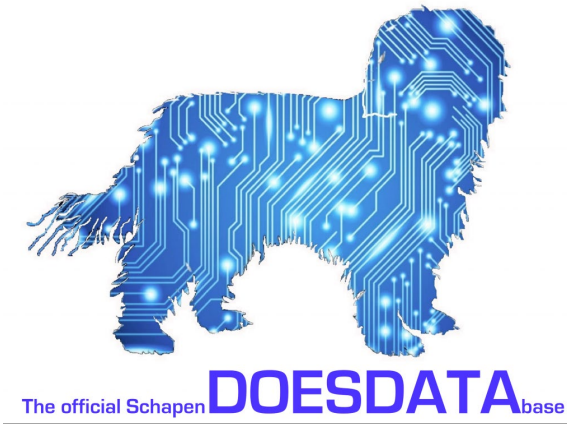
If all five generations are complete, there are 62 animals in the pedigree. If 2 animals are duplicated in the pedigree, there are $62 - 2 = 60$ unique animals left. The calculation is 60 divided by 62, times 100 percent. The AVK is then 96.77%.

If the AVK is less than 100%, there is **always** inbreeding in an animal's pedigree of five generations, but you cannot tell if this is inbreeding from the animal itself or from one or more of its ancestors. Therefore, the AVK of an animal is not directly related to its inbreeding coefficient.

Note: Schapendoezen are currently at 27 generations.



What can we check & compare via Doesdata:



- Inbreeding Coefficient **Average of the entire population: 29,65%**

Inbreeding occurs when two related animals are bred to each other. In other words, if the father and mother are related, the offspring is inbred. Of each gene pair, one gene comes from the father and the other from the mother. The inbreeding coefficient is the probability that both parents pass on the exact same gene to their offspring. The inbreeding coefficient calculates how likely it is that the animal actually passes on two exactly the same genes from both parents, resulting in loss of diversity.

As all our Schapendoezen descend from the same 7 founders, and a lot of inbreeding happened in the early days till late in the 80s and even 90s, it is important to calculate inbreeding at unlimited generations. In recent years attention has been on avoiding inbreeding. Calculating only a few generations is fooling yourself by ignoring our past.

We cannot avoid 'old inbreeding' in Schapendoezen. But since 1990 the breed is big enough to avoid new inbreeding (Study Bijma – 2016).





Distribution of males used in breeding:

All-Time Top Males with Most offspring:

RegistrationNumber	Name	OwnerName	Calc. Offspring	Calc. Litters
NHSB 2017886	BANJER RUCHIËNG BEAUTY DOGS	P.J.M. JANSSEN-VAN HAANDEL	215	39
NHSB 1710081	FRITSKE RUCHIËNG BEAUTY DOGS	P.J.M. JANSSEN-VAN HAANDEL	200	36
NHSB 2998797	TSJERK DIEKE FÂN É WÂLDBLAFFERS	G. ZWEERS-BELDMAN	192	27
LOF 234/38	SOMETHING ELSE GORDINI	A. POUVESLE	176	31
NHSB 2535439	JANNES (XHOFM)	P.J.M. JANSSEN-VAN HAANDEL	167	30
NHSB 2067846	MYCKOS ASTI VAN HET HASKERHÛS	J. WIERDA-GORTER	165	23
NHSB 2822828	TINY SCOUNDREL BENNY HILL	D. BOUMA	154	19
SF 36990/91	UTRECHT DE LA RICHESSE	J.-C. PERSON	141	31
LOF 836/102	DOUBLE CHEESE VAN 'T DOEZEHOES	J. GLANER & G. JENNY	140	25
NHSB 1509386	ANOES LE TRUWELS	K. SLOMP	135	21
SE 35374/2016	EXQUISITE EZRAH DES UNS ET DES AUTRES	J.WIERDA-GORTER/G. SKALLMAN	131	18
NHSB 1575982	TOMMY DE LA RICHESSE	P.J.M. JANSSEN-VAN HAANDEL	130	17
NHSB 2593012	HUGO BOSS VON ADAM'S ZOTTELN	B.H.M. HEUTEN	110	17
NHSB 2269950	AKEEM NAOMI VAN HET HASKERHÛS	J. WIERDA-GORTER	109	16
NHSB 2648456	AALDERT-PIEN FÂN É WÂLDBLAFFERS	G. ZWEERS-BELDMAN	105	15
LOF 78/10	VOLENDAM DE LA RICHESSE	J.-C. PERSON	105	27
LOF 2542/359	CRACK DE LA HUME DES DOMBES	M. PERCQ	104	21

Currently used
in breeding





Top pup-producing males in 2022:

Row Labels	No. of pups 2022	Total no. of pups	Total number of litters
PIPER DU ROYAUME DE FANELIA	29	29	3
KARUSO TARA VAN HET HASKERHÛS	25	50	7
CAMAGIS KODY	24	24	3
URBANUS HUS VAN DIE DOES	22	22	3
ALEX BIJOU VAN 'T STRUTJE	20	58	10
XEP ODI VAN DE BREDERWIEDE	19	35	5
VERY CHARMING MR. BOJANGLES DES UNS ET DES AUTRES	19	29	3
DOLLE DORUS GIJS VAN DE ZEEUWSE STRANGE	17	30	5
FANICA IKOS AJJAC IKAROS	16	19	4
AMOR VAYA VAN DE RIETVELDSCHÉ VAART	16	16	2
BAS (XHAAI)	15	23	3
CAMAGIS KIAN	14	14	2
ENDLESS LOVEAFFAIRS DIEGO	12	12	2
TSJERK DIEKE FÂN É WÂLDBLAFFERS	11	192	27
HAPPIEST TAILS U MY SWEETHEART	11	19	4
HAPPYSCHAPS STAR JASON JUNIOR	11	13	3
LANDEPAUKUN IDEANIKKARI	11	11	2
FEELING DU JARDIN DES LUCIOLES	10	69	11
WHENEVER WHEREVER DES UNS ET DES AUTRES	10	16	2
ABBOU RING-MA VAN DE FRISADORA	10	10	1
NALLE-HAUKUN ERASMUS	10	10	1
CAMAGIS XOLO	9	48	8
ZATTSCO NOTHING ELSE MATTER BUT NEO	9	33	5



Total Overview Population 2022



- Number of pups born: 705
- Number of litters: 110
- Number of males used: 81
- Number of breeders: 90
- Number of countries: 14

- Average Mean Kinship: 29,26%
- Average Inbreeding Coefficient: 29,65%
- Average Ancestor Loss 5 generations (AVK): 93%

	Pups
2021	893
2020	666
2019	763
2018	747
2017	907
2016	1020
2015	987

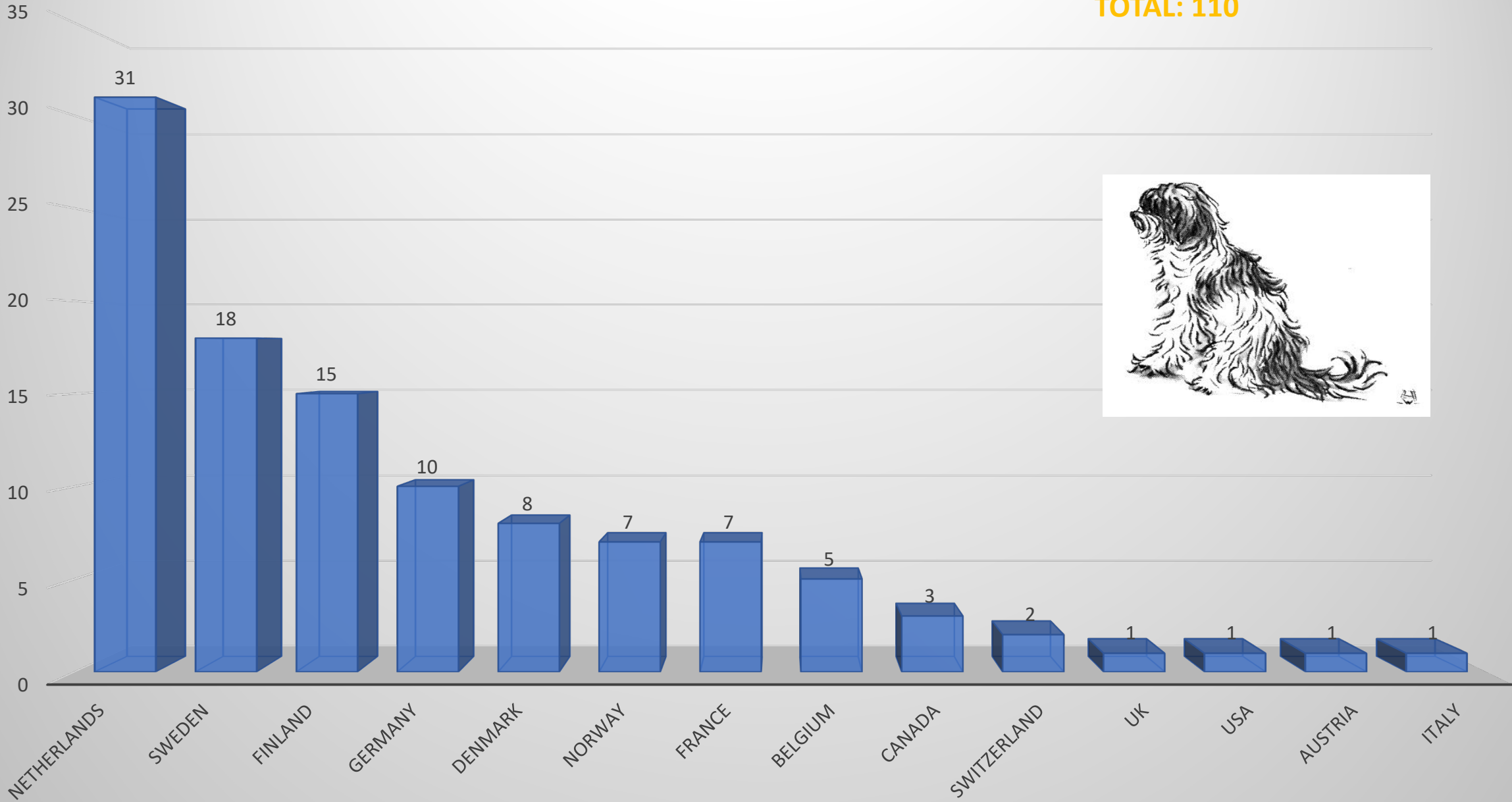
Study Windig 2018:

- Average 900 pups per year (worldwide)
- 9% males and 15% females are used for breeding



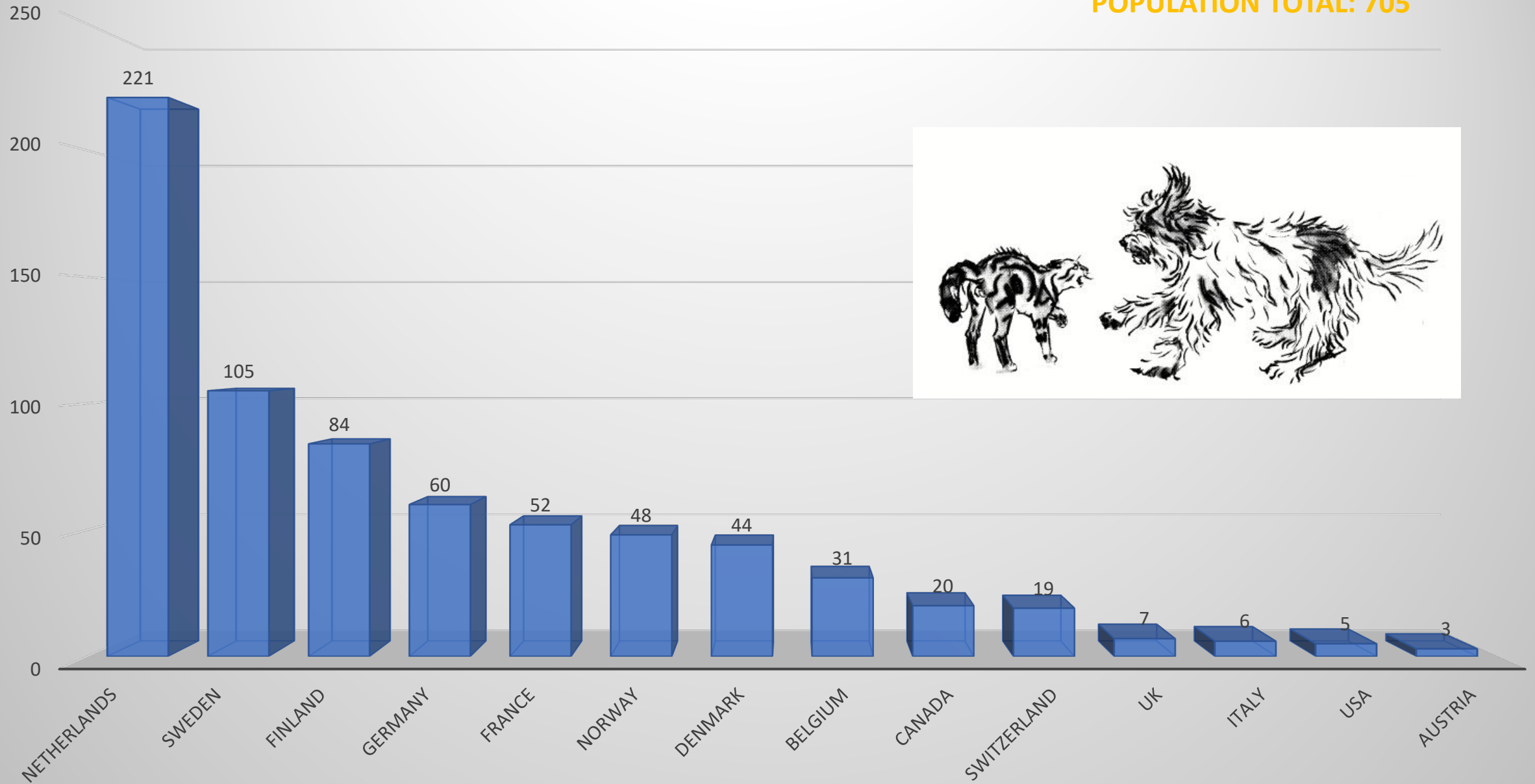
Litters 2022

TOTAL: 110



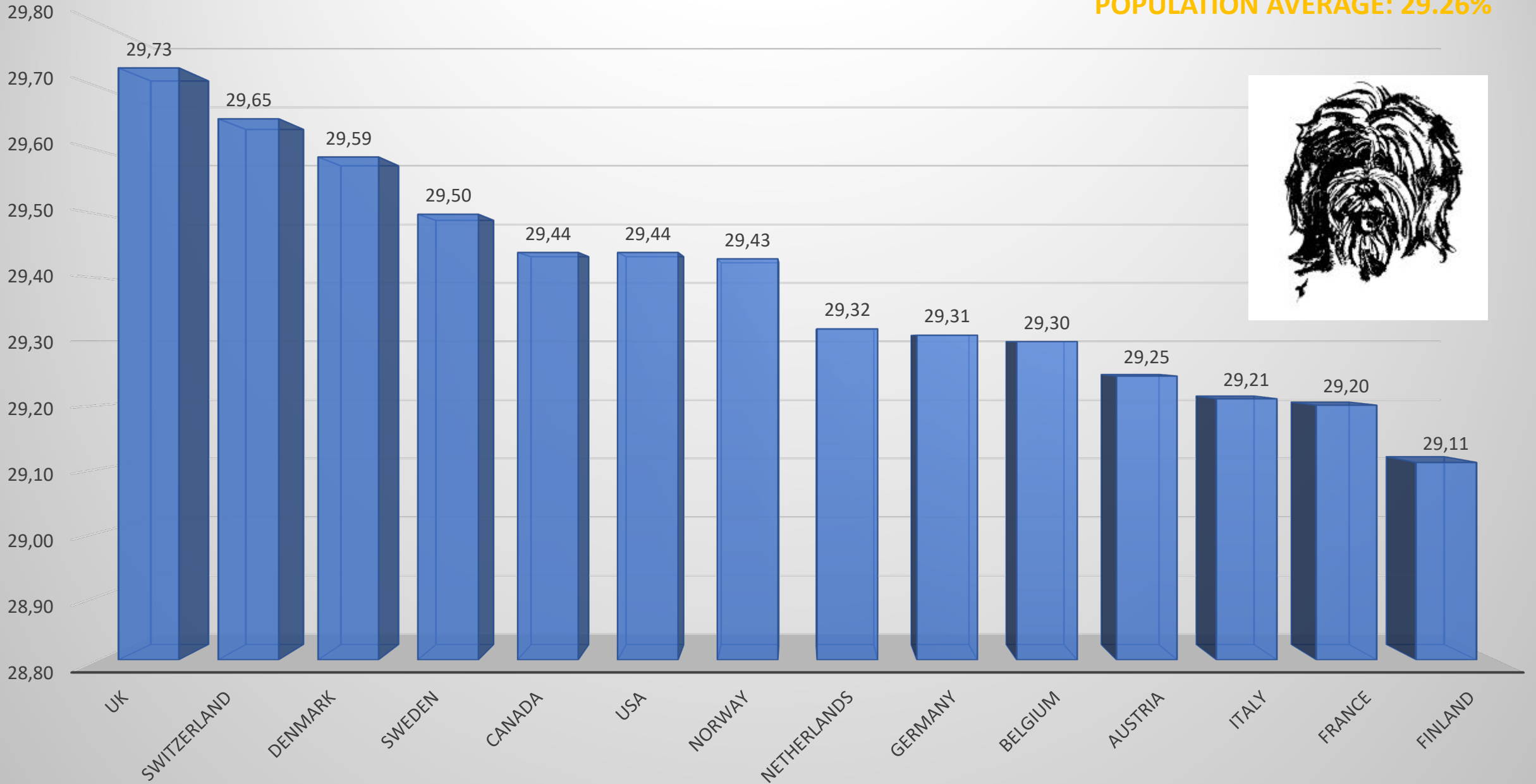
Number of pups 2022

POPULATION TOTAL: 705



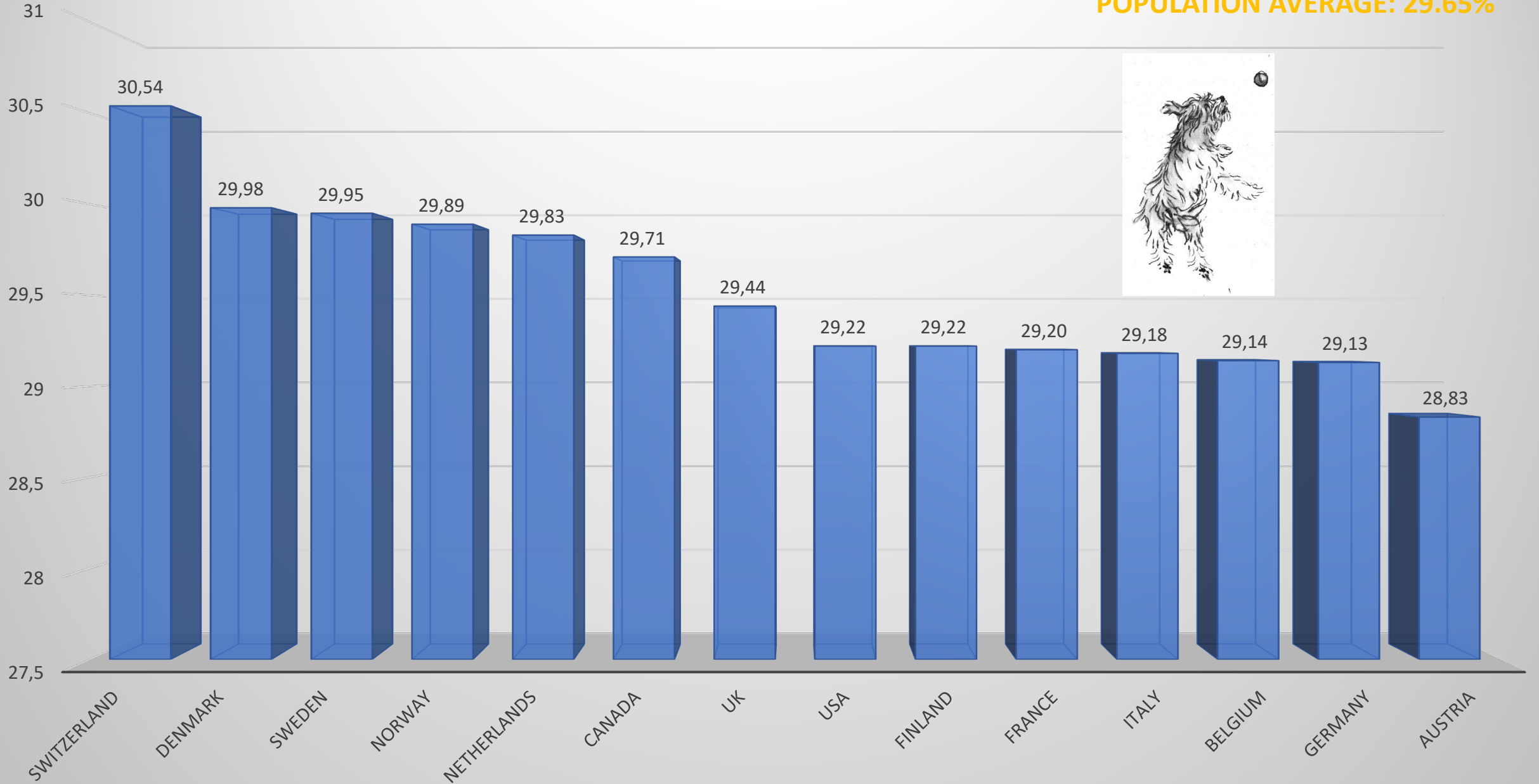
Average MK 2022

POPULATION AVERAGE: 29.26%



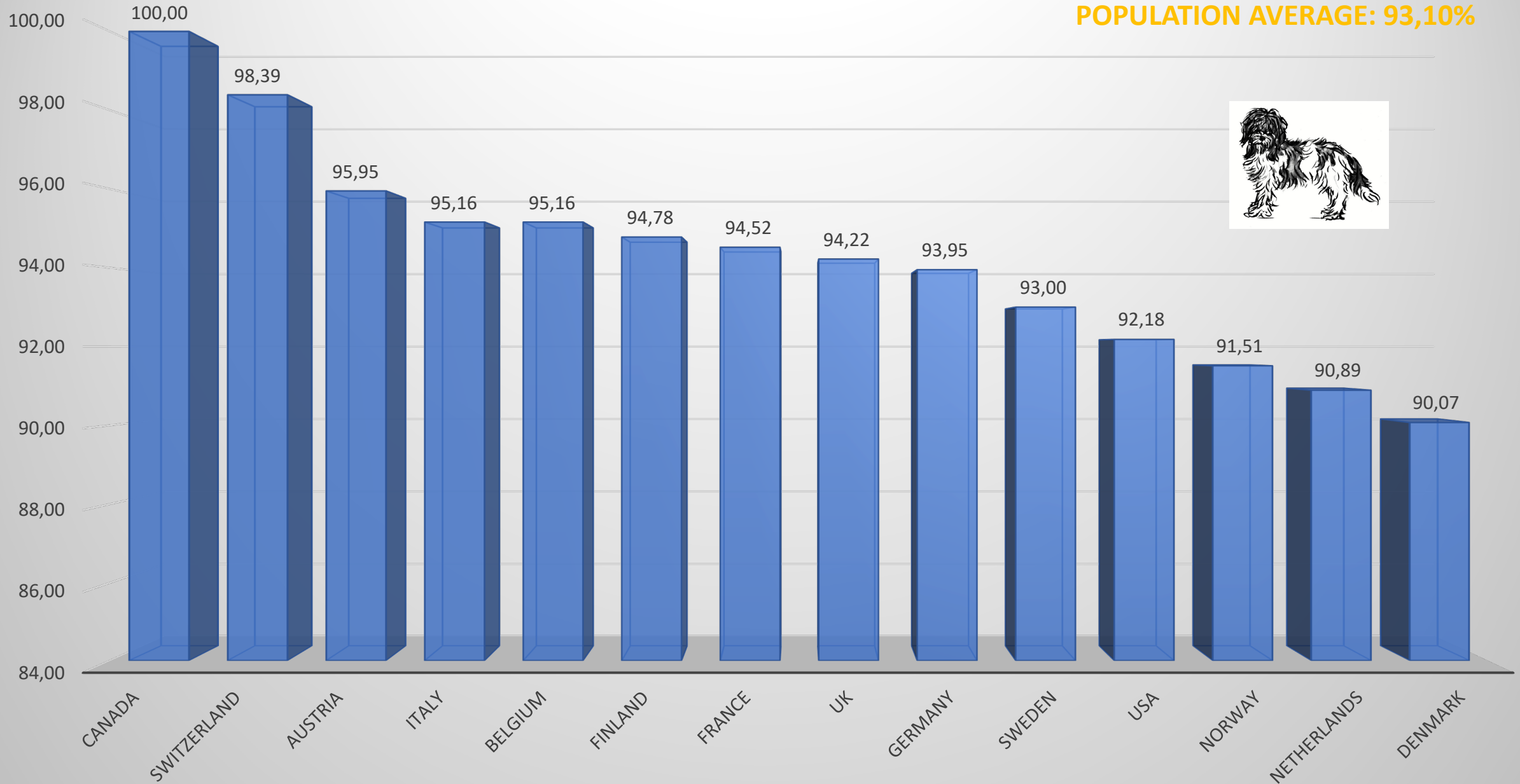
Average IC 2022

POPULATION AVERAGE: 29.65%



Average AVK 2022

POPULATION AVERAGE: 93,10%



Per Breeder:



Breeder	More than 1 Litter
K. JANSEN-KNIPPING	4
A. KURKO	3
A. JONKER-POSTMA	2
A. LEIFSTEDT	2
A. RAUZY	2
C. CAMPBELL	2
C. CLASBORN HAMMAR	2
G.M.L. DE WIT-BAZELMANS	2
H. JAKOBSEN	2
I. DAHLQVIST	2
IJ. HAANSTRA	2
J.M.H.L. JAEQX	2
M. DE WIT-VAN DIETEN	2
M. JÄNISNIEMI-HONKALA	2
M.T.W.M. HANEGRAAF	2
P. LAMPOLA	2
R. WÄLDE	2
V. VAN SLAGMOLEN	2

			Average population MK:		Average population IC:		Average population AVK:	
			29,26		29,65		93,10	
Country	Litters	Number of pups	Litters MK Green	Litters MK red	Litters IC Green	Litters IC Red	Litters AVK green	Litters AVK red
<i>Austria</i>	1	3	1	0	1	0	1	0
Belgium	5	31	2	3	2	1	4	3
Canada	3	20	1	2	2	1	1	2
Denmark	8	44	0	8	2	6	4	4
Finland	15	84	11	4	13	2	12	3
France	7	52	2	4	6	1	5	2
Germany	10	60	3	7	6	4	7	3
<i>Italy</i>	1	6	1	0	1	0	1	0
Netherlands	31	221	13	17	15	16	11	20
Norway	7	48	2	5	3	4	4	3
Sweden	18	105	5	13	8	10	9	9
Switzerland	2	19	0	2	0	2	0	2
UK	1	7	0	1	1	0	1	0
USA	1	5	0	1	1	0	1	0

	Average	Average	Average						
	29,26	29,65	93,10						
Country	Average MK	Average IC	Average AVK	Lowest MK	Highest MK	Lowest IC	Highest IC	Lowest AVK	Highest AVK
<i>Austria</i>	29,25	28,83	95,16	29,25	29,25	28,83	28,83	95,16	95,16
Belgium	29,30	29,14	94,52	29,01	29,57	28,56	31,28	82,26	98,39
Canada	29,44	29,71	90,89	29,25	29,76	29,28	30,32	90,32	96,77
Denmark	29,59	29,98	93,00	29,37	29,77	29,04	30,62	88,71	96,77
Finland	29,11	29,22	95,95	28,81	29,42	28,18	35,78	72,58	100,00
France	29,20	29,20	93,95	28,62	29,61	28,46	30,16	90,32	100,00
Germany	29,31	29,13	94,78	28,89	29,59	27,80	29,81	88,71	100,00
Italy	29,21	29,18	95,16	29,21	29,21	29,18	29,18	95,16	95,16
Netherlands	29,32	29,83	92,18	28,67	29,86	28,67	31,40	83,87	100,00
Norway	29,43	29,89	94,22	28,98	29,89	28,25	31,65	88,71	100,00
Sweden	29,50	29,95	91,51	28,97	29,90	28,24	31,82	80,65	98,39
Switzerland	29,65	30,54	90,07	29,49	29,87	30,27	30,54	88,71	91,94
UK	29,73	29,44	98,39	29,73	29,73	29,44	29,44	98,39	98,39
USA	29,44	29,22	100,00	29,44	29,44	29,22	29,22	100,00	100,00



Conclusions Breeding 2022

- Focus on IC and no double names on pedigree is present, many counties breed below the average of the population. This is however focus on the individual pair/litter.
- There is not yet so much focus on the relatedness to the population. MK should be used more.
- The average inbreeding coefficient is at 29,64% This means that an average pups has almost 30% homozygote genes, 30% of the gene inherited from father is exact copy to the gene inherited from mom. **This is almost 5% higher than a halfbrother x halfsister pair.**
- The average ancestor loss is 93% which means **at least 3 names** appear twice in a 5 generation family tree of every pup.
- Some males are used way too much. We need to restrict the use of the same male over and over again.

Attention should shift in 2023 from individual breeding to breeding as one large population! At least at breedclub level a healthy population instead of only healthy litters should be the goal.



Conclusions Overall Breeding Status

- Increased in 45 years from 22% to 29%
- Inbreeding increase 0.88% per generation
- Inbreeding increase past 10 years 0.59% per generation



Schapendoes

- inbreeding increase has decreased
- was too high in the past
- should still be a little lower

-Conclusions:

- No reason to sit back and relax
- Room for improvement in genetic management



Increase in inbreeding	Risk judgement	Effective population size
> 1%	Extinction because of accumulation hereditary defects	< 50
0,5% - 1%	Hereditary defects will most certainly appear	50-100
0,25% - 0,5%	Hereditary defects may appear	100-200
< 0,25%	Small chance of hereditary defects	> 200



What are acceptable figures? What to aim for:

- Mean Kinship: we constantly calculate the average of the population. We should aim to breed with dogs with low MK (green) and breed low MK Puppies (green). This means: use dogs with a lower than average MK. This strategy reduces the increase in inbreeding the best.
- IC: this number is 'only' about the relatedness of mother and father. It does not take the population into account, nor does it state anything on old or new inbreeding. Inbreeding is not hereditary. On long term, focusing on IC is less effective than focusing on Mean Kinship. However, the risk for a puppy to receive monozygote genes instead of a heterozygote pair is still dangerous as it weakens the immune system. Breed below the population average!
- AVK: there should not be common ancestors in the close generations of future pups. Strive for 100% AVK.
- Use as many different males as possible, **restrict the use of your males!**
- With the above strategies, we can maximize our efforts to keep the increase in inbreeding per generation interval low. Once all of this becomes truly impossible, outcross with other breeds is the only alternative left to keep our breed alive. In the end, this is unavoidable.



Teamwork

