Country profiles regarding the use of imported dairy bulls

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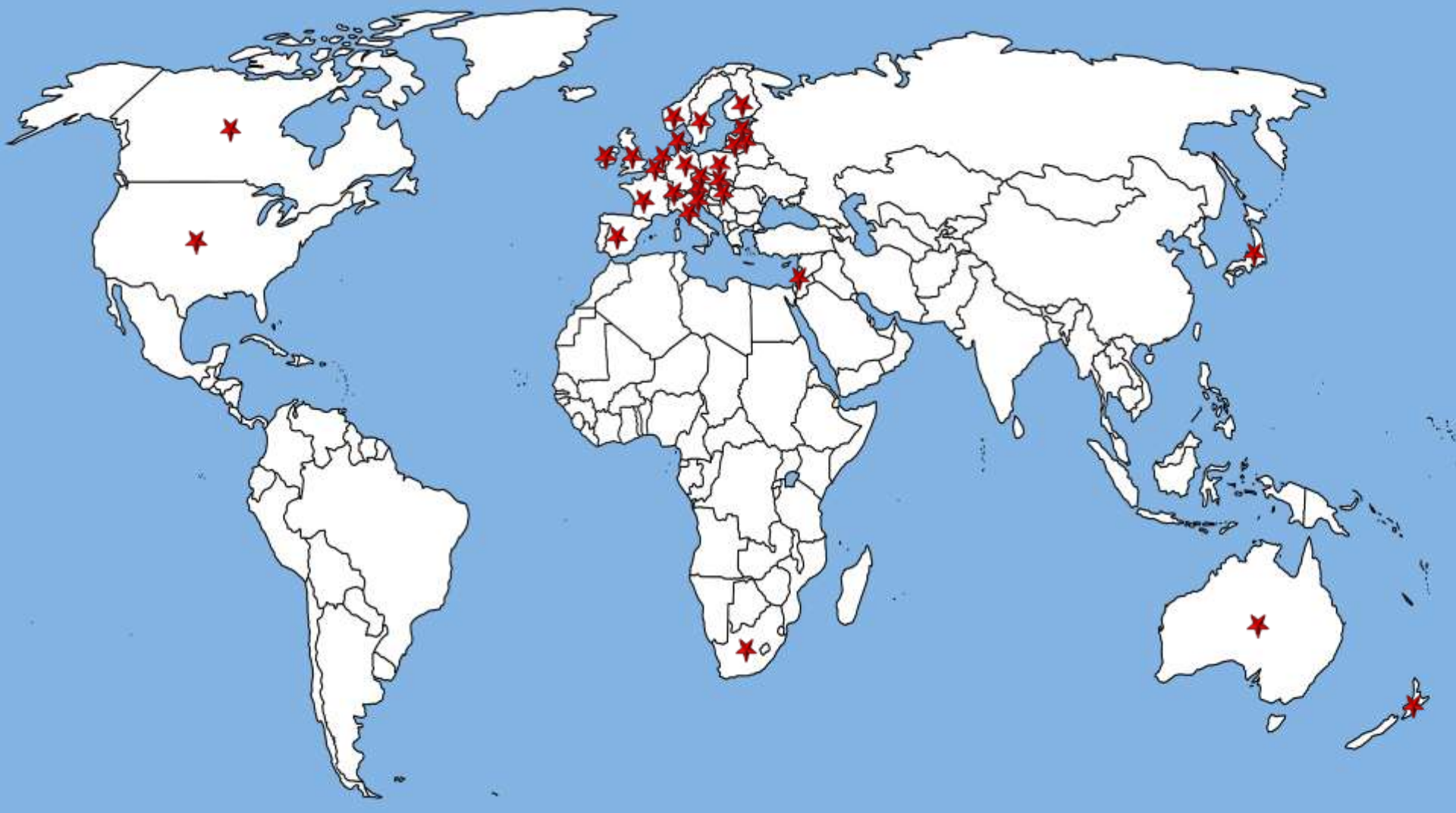
Vision Statement

Interbull: the worldwide network providing genetic information services for improvement of livestock

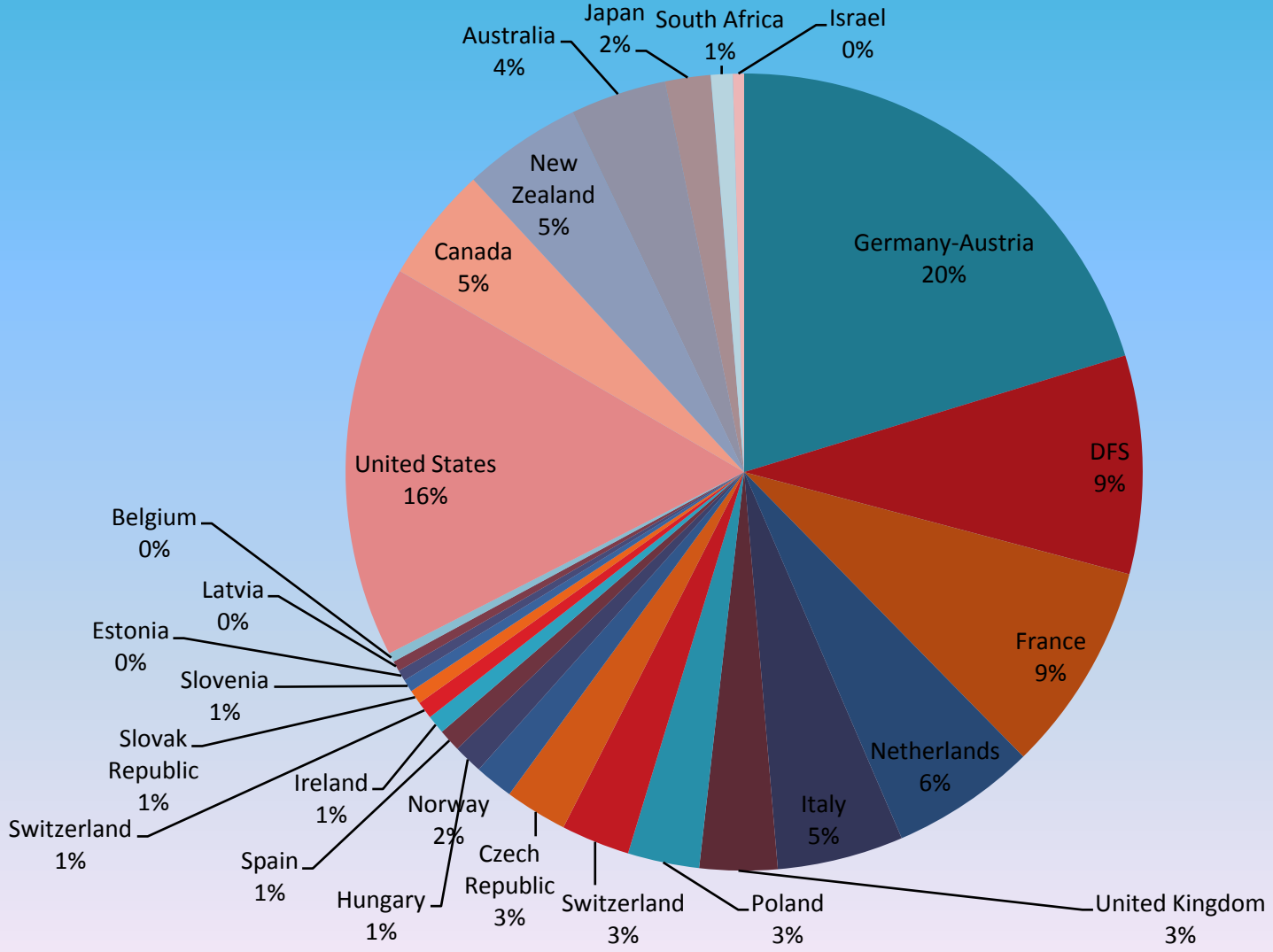
Interbull Ultimate Goal

Facilitate INTERNATIONAL FAIR TRADE of cattle genetics!

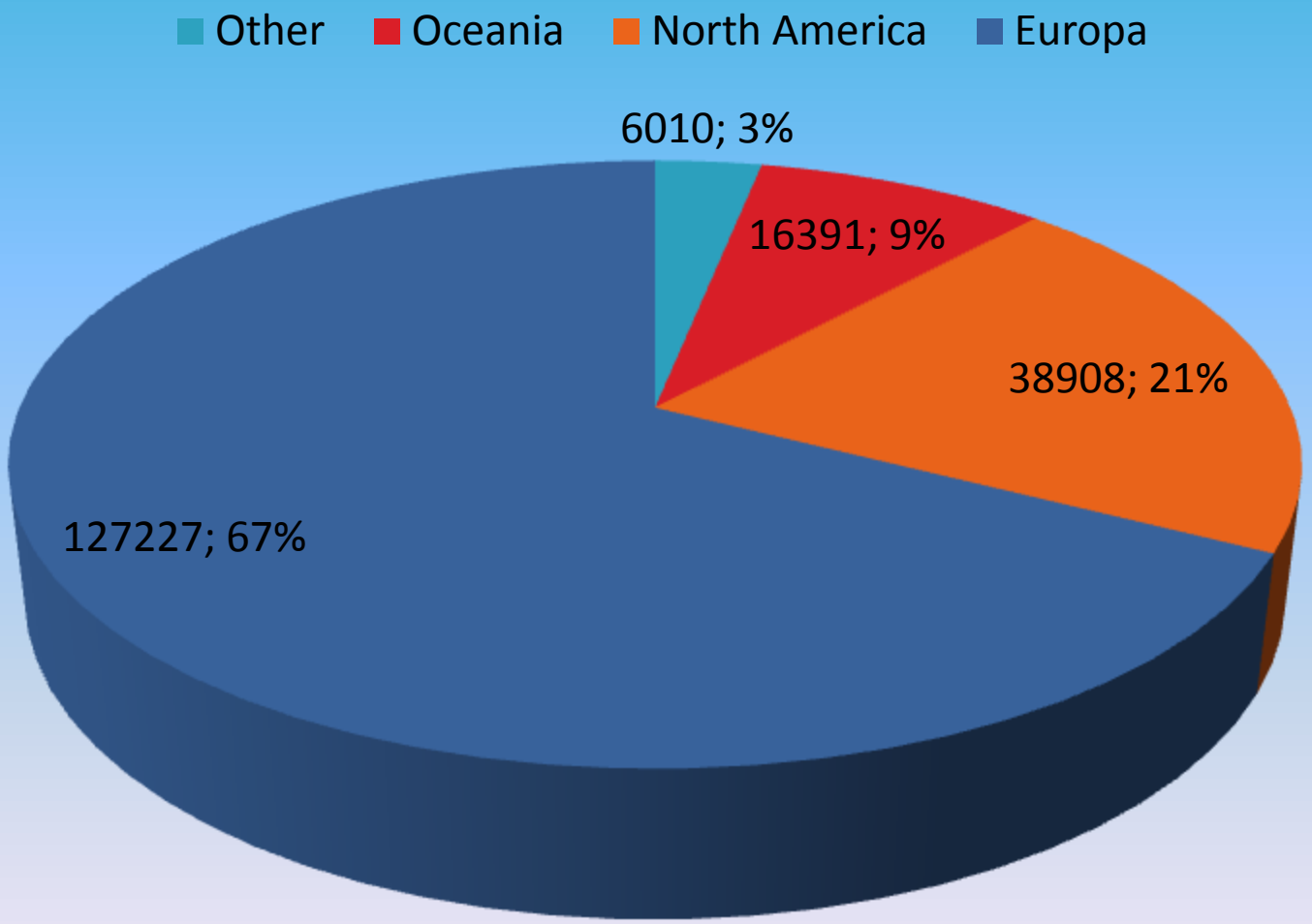
Interbull Members



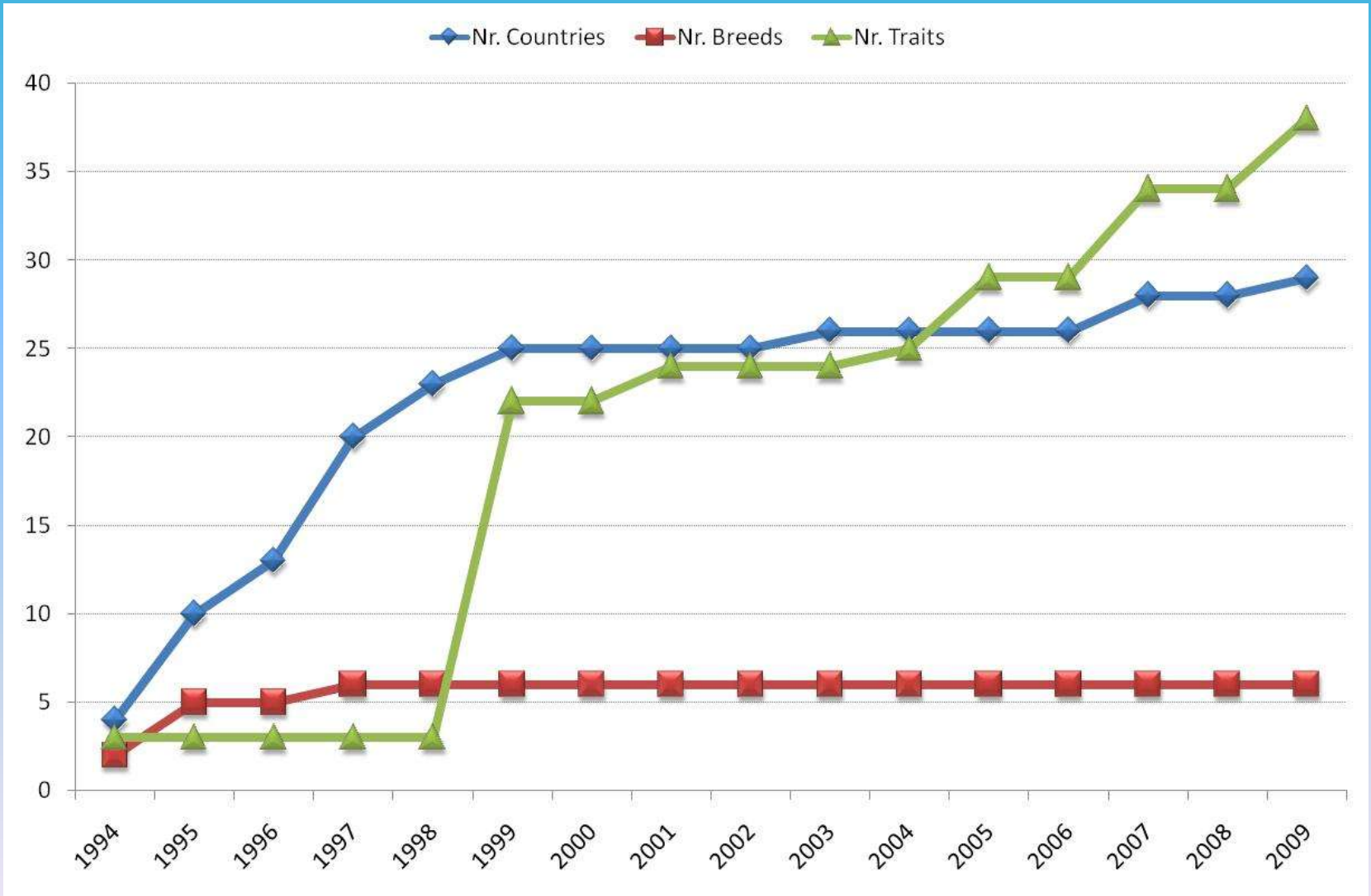
Distribution of Bulls Evaluated by Interbull According to Country (2009, all breeds)



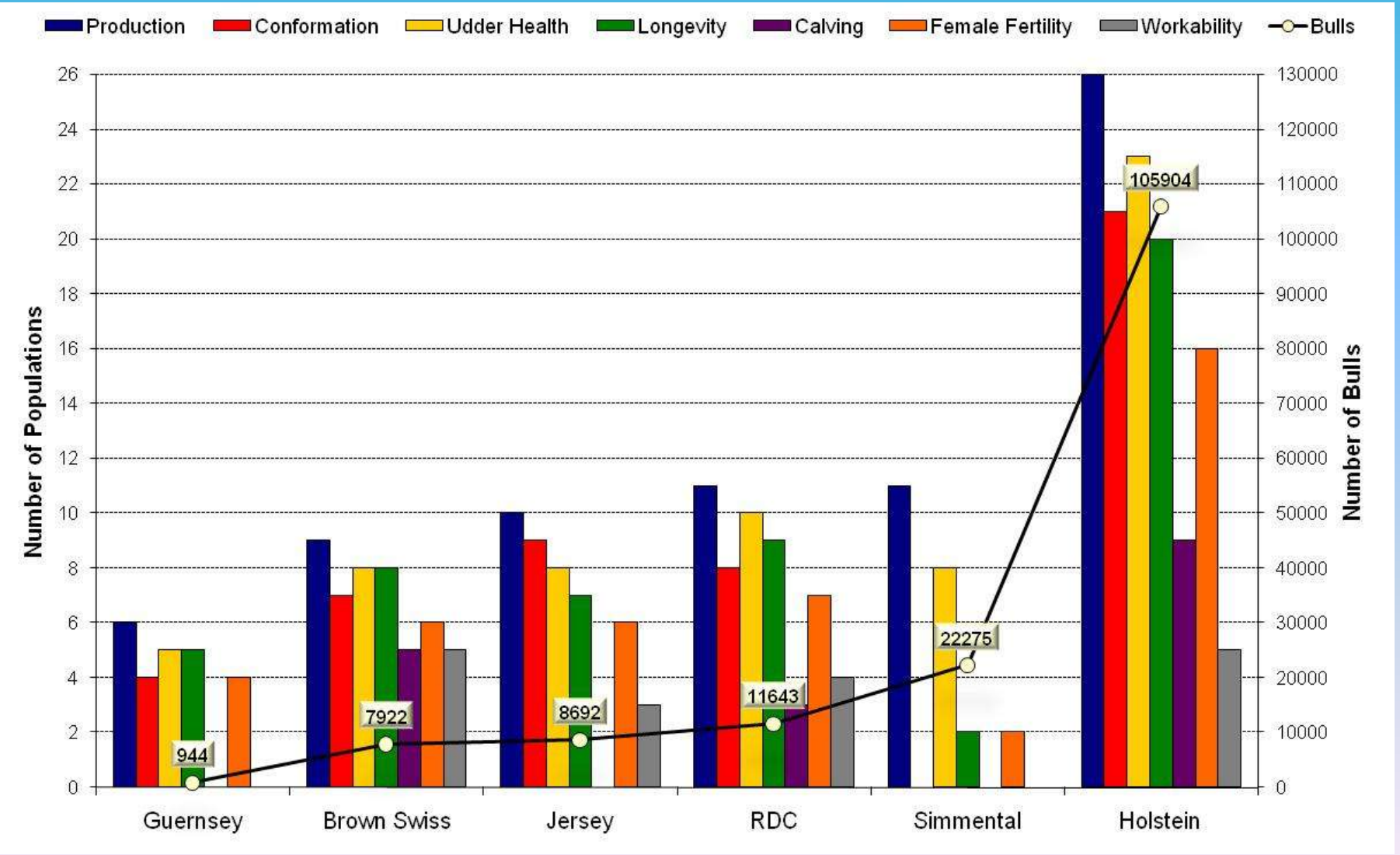
Distribution of Bulls Evaluated by Interbull According to Region in 2009 (188 536 bulls, all breeds)



Evolution of populations and traits at Interbull



Number of populations and bulls per breed-trait combination



Difficulties for international trade

- Genotype X Environment Interaction
- Common ground for comparisons
- Exporting vs. Importing countries interests
- Range of trait definitions, modeling, assumptions
- ALL STILL EXIST WITH GENOMICS!

Difficulties for international trade vs. Interbull contribution

- Genotype X Environment Interaction
  - MACE: evaluate same animals in different scales
- Common ground for comparisons
  - National evaluations only assess performances within country
- Exporting vs. Importing countries interests
  - Need for a neutral evaluation
- Range of trait definitions, modeling, assumptions
  - Standardization and validation

Interbull International Genetic Evaluations

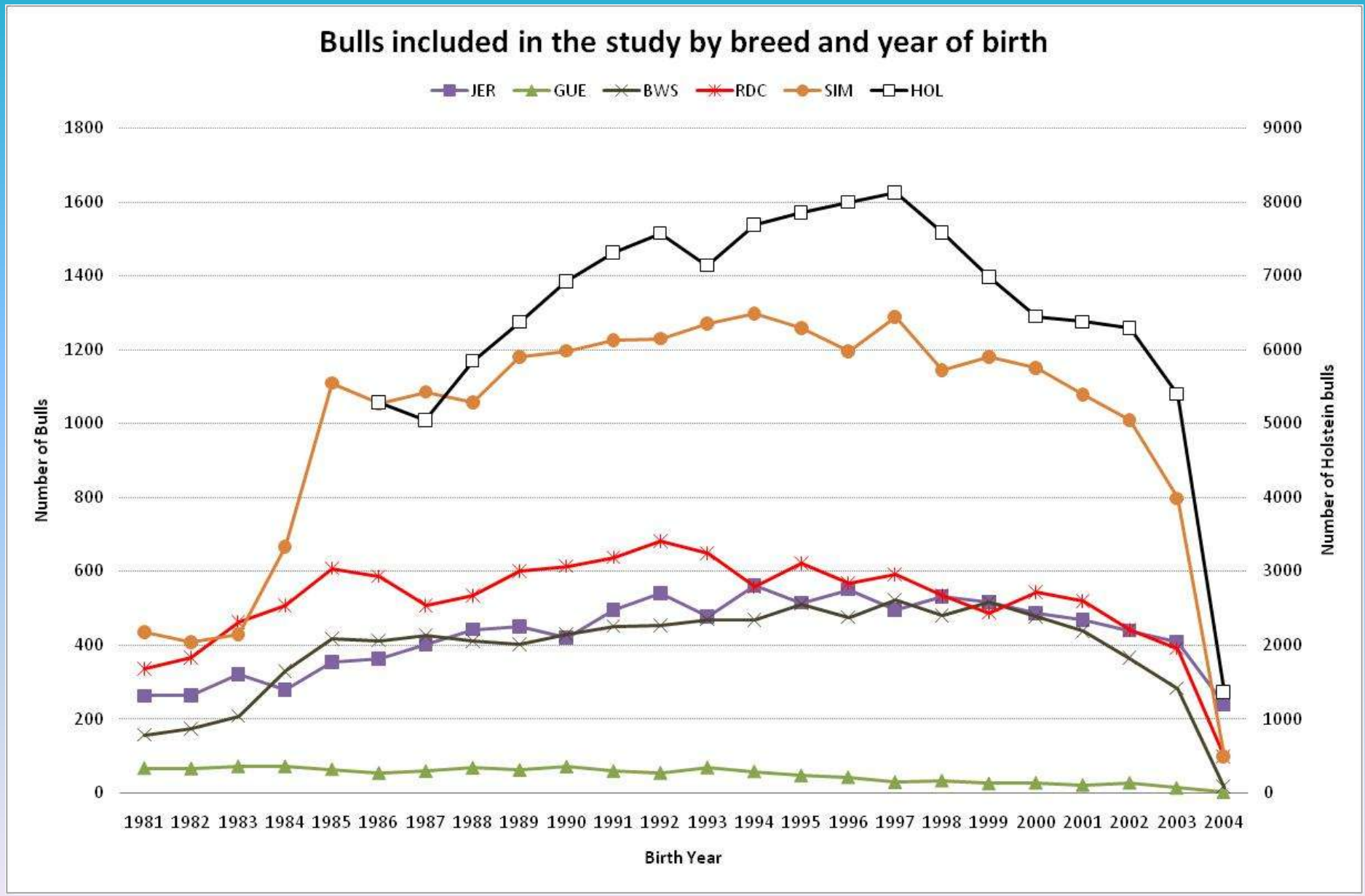
- Summary of the operation
  - 29 countries
  - 73 populations
  - 6 different dairy breeds
  - 38 different traits
- Most of the international trading of dairy genetics refers to animals that have been evaluated at Interbull in order to be marketed in several countries.
- Multi-country pedigree file at Interbull is one of the most complete sources of information in global animal breeding of any species.

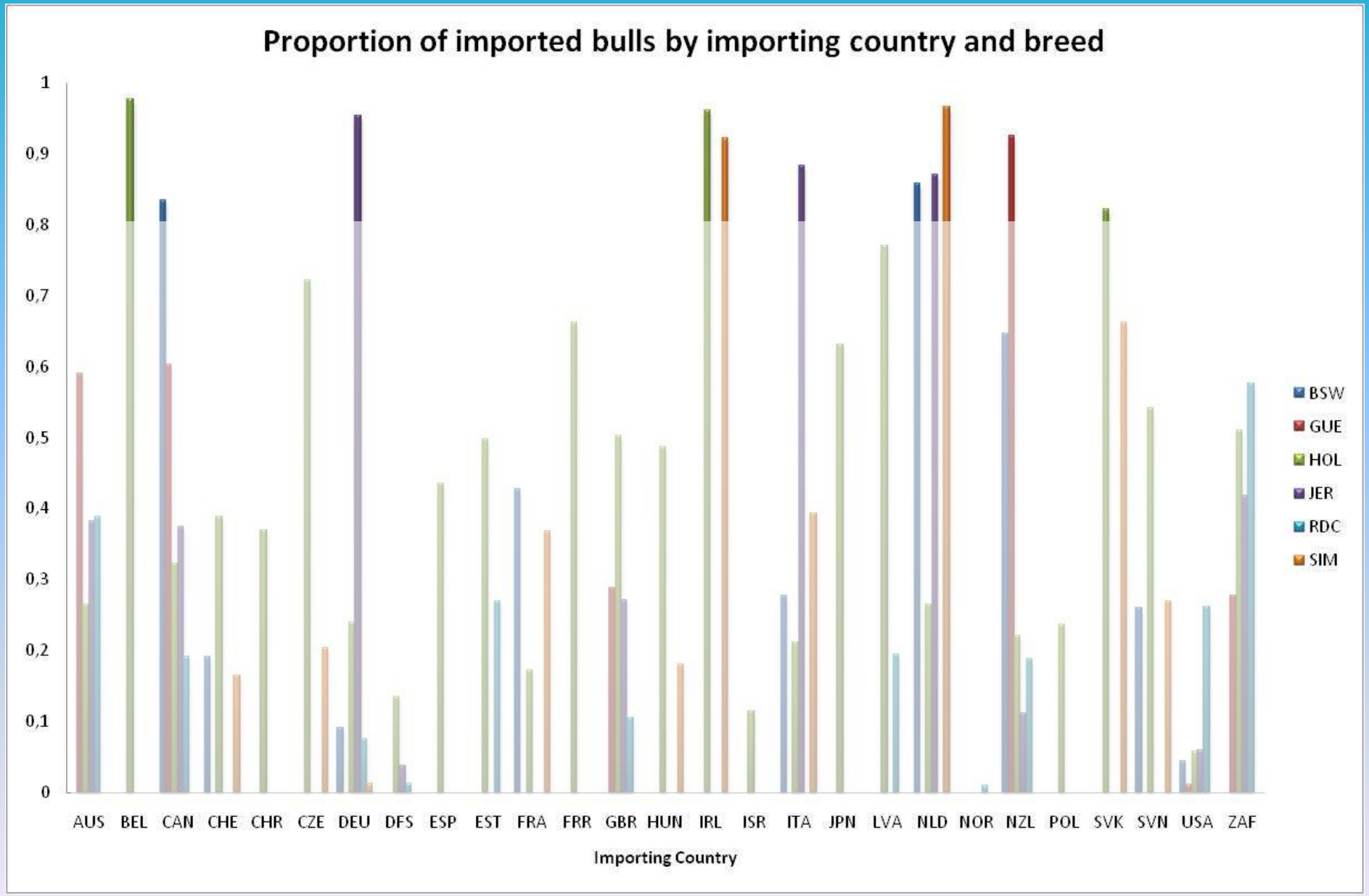
Materials & Methods

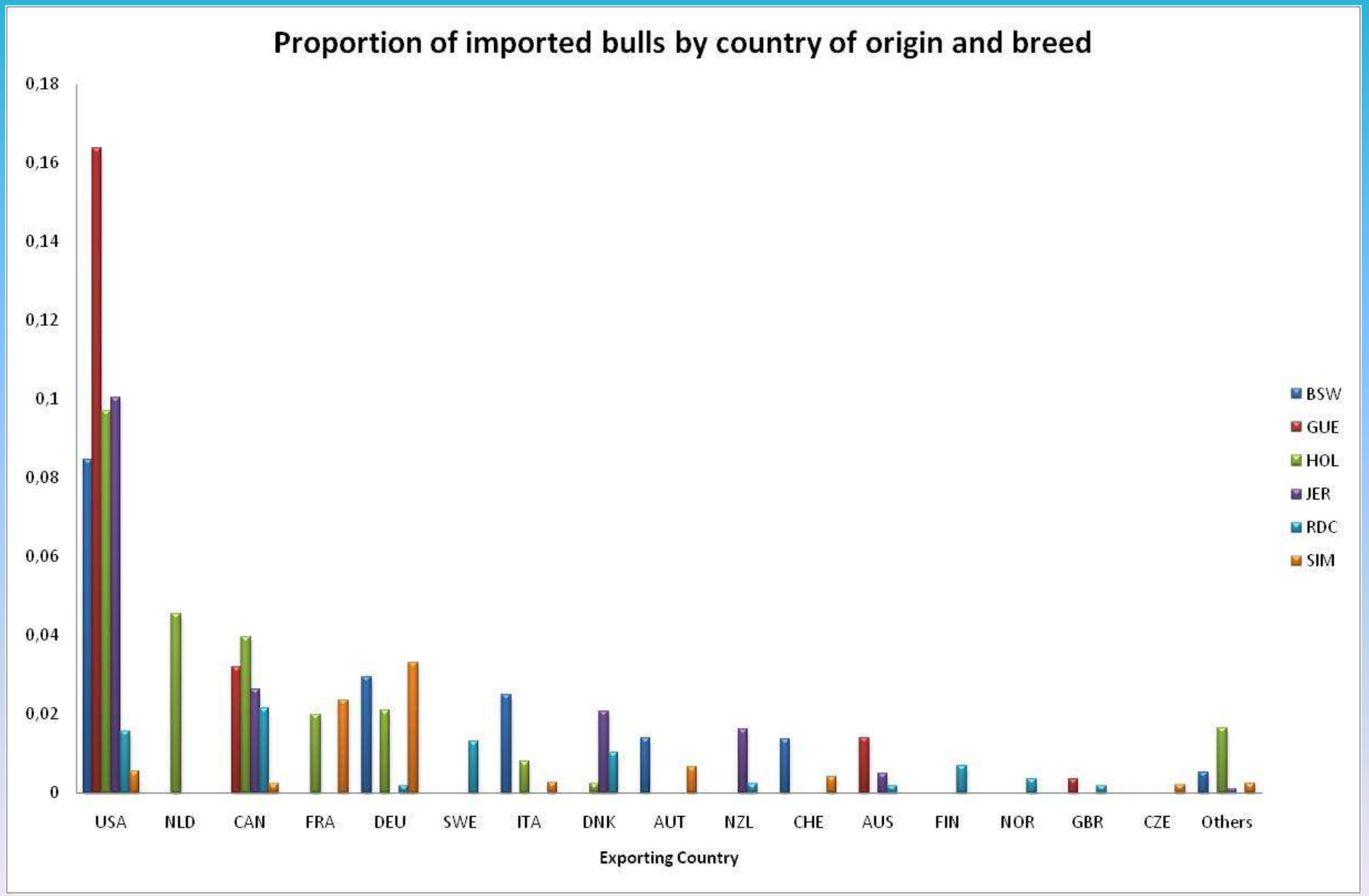
- Analysis of both importing and exporting countries profiles from Interbull pedigree
- 180 617 bulls with official national evaluations in January 2009 run
- 37 256 identified as foreign bulls by the reporting country
  - same bull may have been reported by different importing countries
- 20.6% of dairy bulls worldwide are imported
- Cluster analysis was applied in data from six dairy breeds to group countries according to two criteria:
  - ratio between number of imported bull by country of origin and total number of bulls reported
  - ratio between number of imported bulls by country of origin and total number of imported bulls

Data included in the study

Breed	Total number of bulls	Total number of imported bulls	% Imported bulls
Brown Swiss	9279	1590	17.1
Guernsey	1160	247	21.3
Holstein	123619	30777	24.9
Jersey	10269	1737	16.9
Red Dairy Cattle	12438	966	7.8
Simmental	23852	1939	8.1

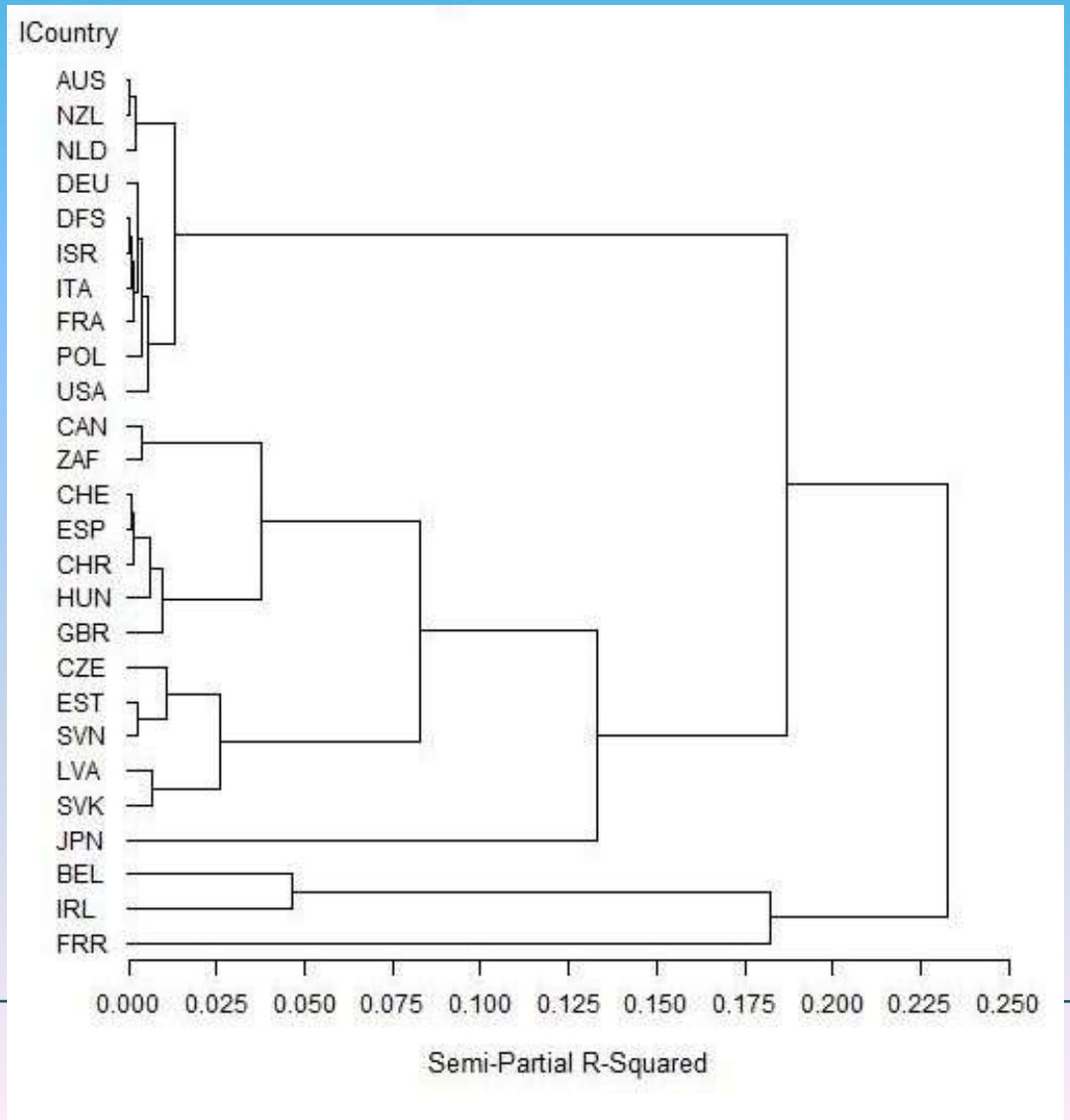

Bulls included in the study by breed and year of birth
JER
GUE
BWS
RDC
SIM
HOL
Number of Bulls
Number of Holstein bulls
Birth Year
0
200
400
600
800
1000
1200
1400
1600
1800
1000
2000
3000
4000
5000
6000
7000
8000
9000
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004

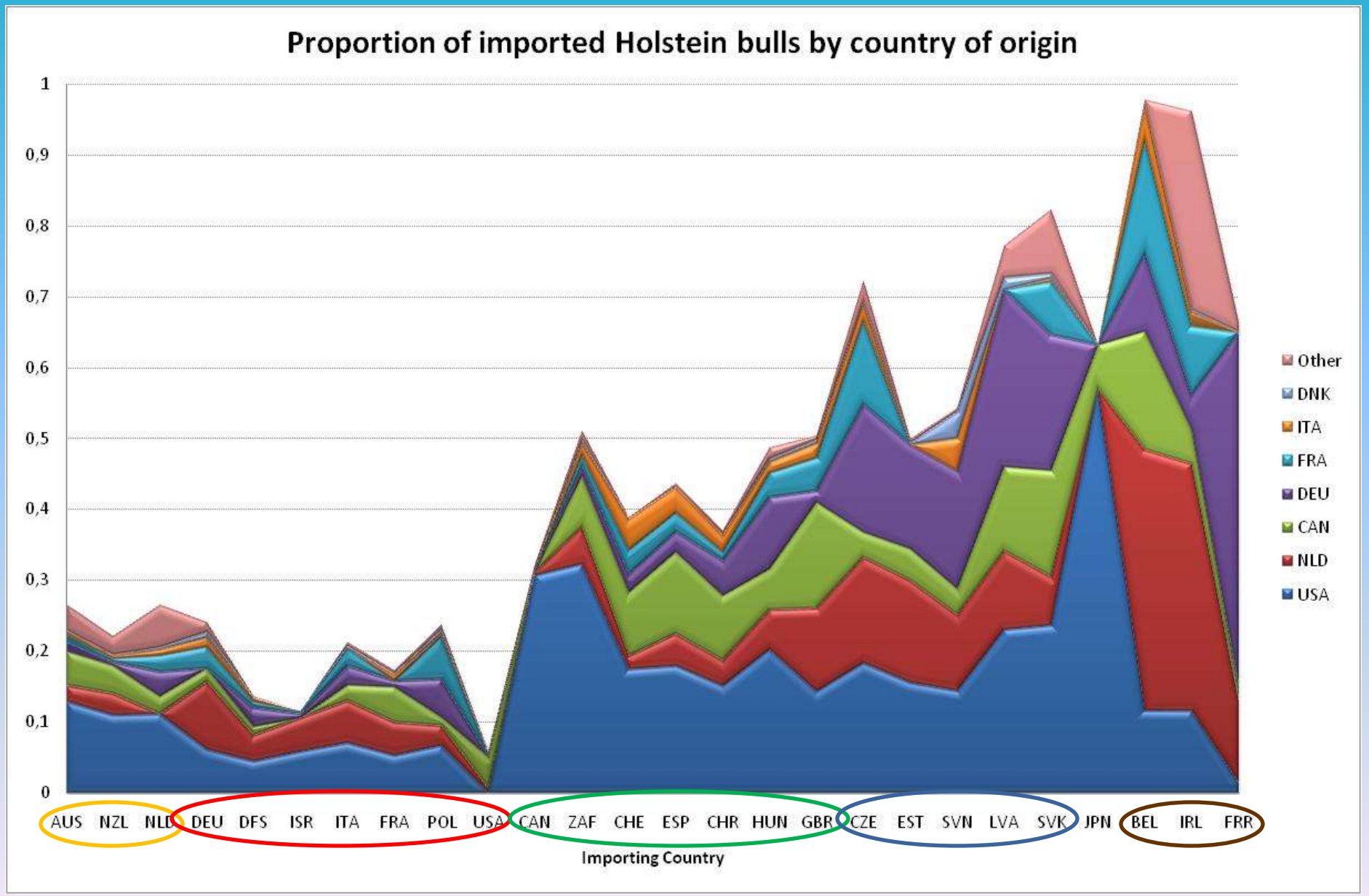

Proportion of imported bulls by importing country and breed
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
AUS BEL CAN CHE CHR CZE DEU DFS ESP EST FRA FRR GBR HUN IRL ISR ITA JPN LVA NLD NOR NZL POL SVK SVN USA ZAF
Importing Country
BSW
GUE
HOL
JER
RDC
SIM


Proportion of imported bulls by country of origin and breed
0,18
0,16
0,14
0,12
0,1
0,08
0,06
0,04
0,02
0
USA
NLD
CAN
FRA
DEU
SWE
ITA
DNK
AUT
NZL
CHE
AUS
FIN
NOR
GBR
CZE
Others
Exporting Country
BSW
GUE
HOL
JER
RDC
SIM

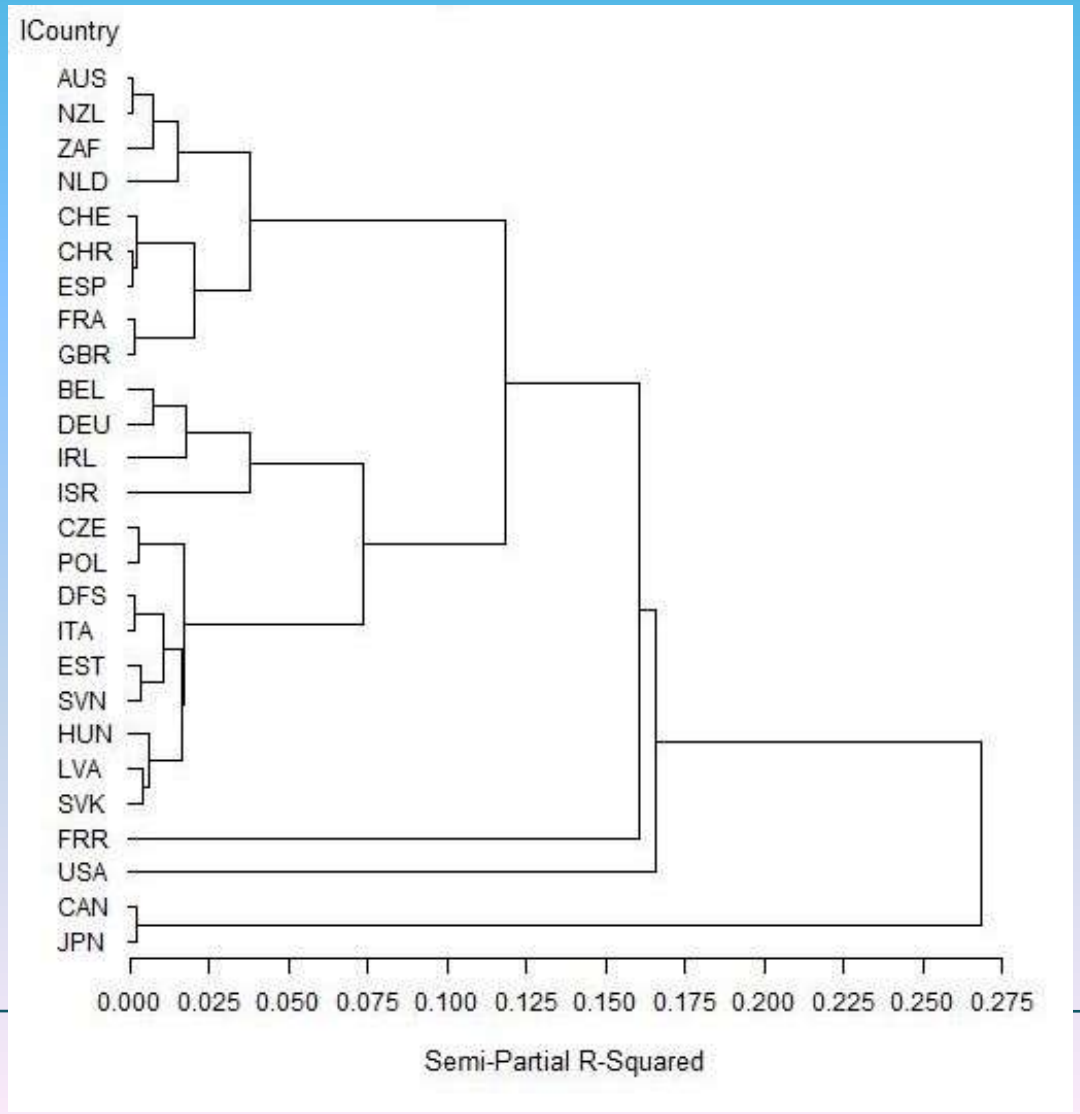
HOLSTEIN

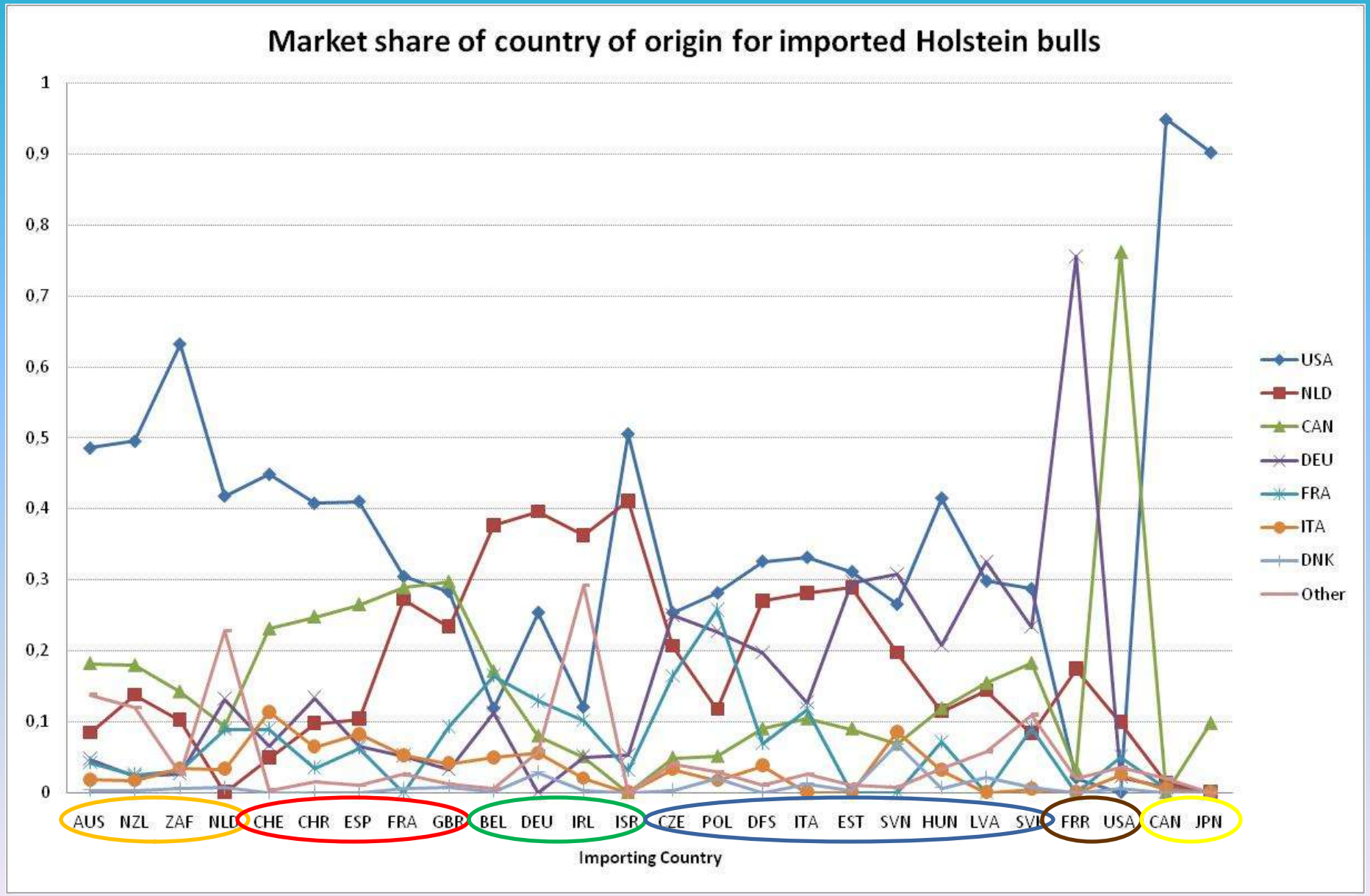
Cluster analysis: imported HOL bulls per country/total number of HOL bulls




Proportion of imported Holstein bulls by country of origin
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
AUS NZL NLD DEU DFS ISR ITA FRA POL USA CAN ZAF CHE ESP CHR HUN GBR CZE EST SVN LVA SVK JPN BEL IRL FRR
Importing Country
Other
DNK
ITA
FRA
DEU
CAN
NLD
USA

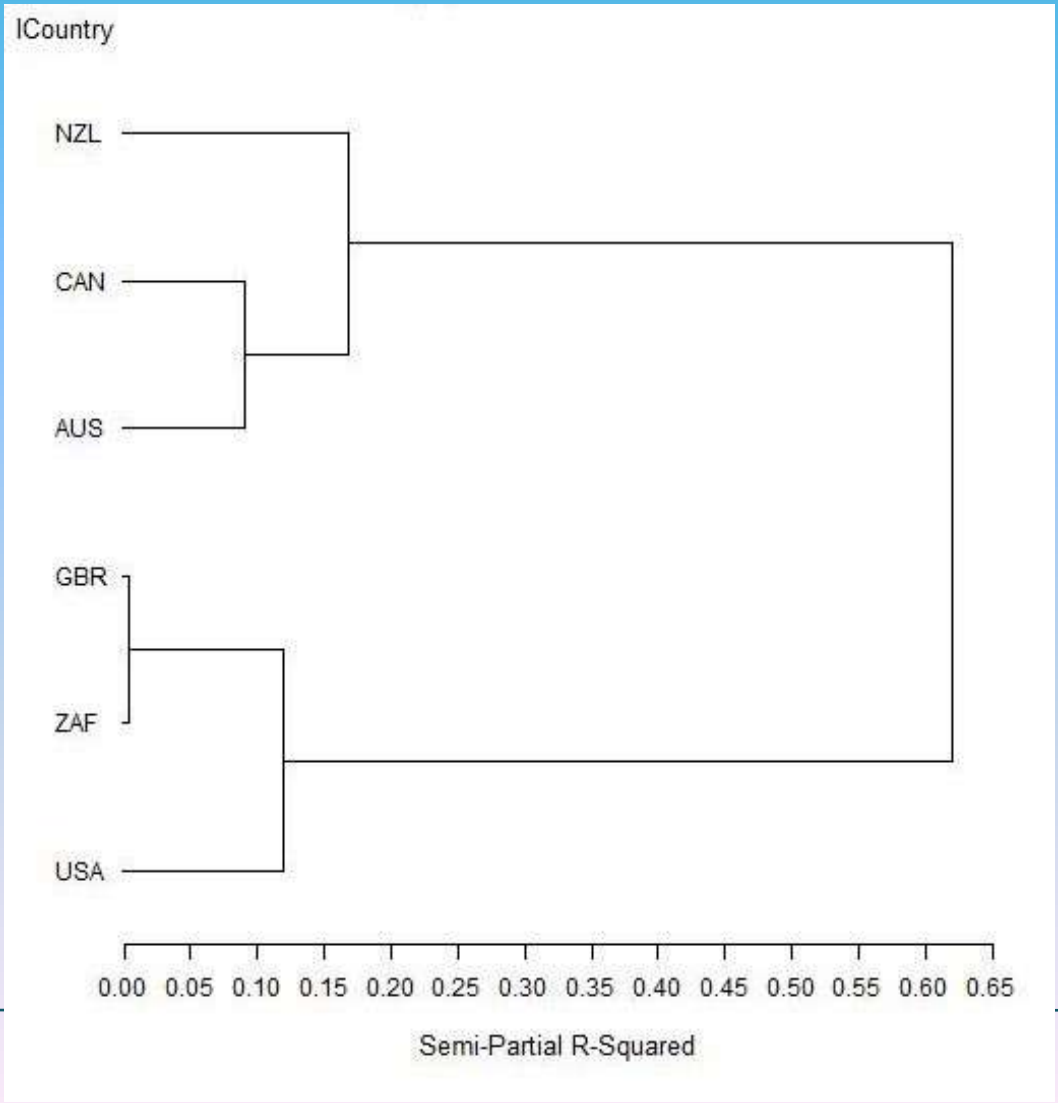
Cluster analysis: imported HOL bulls from a given origin/total number imported HOL bulls

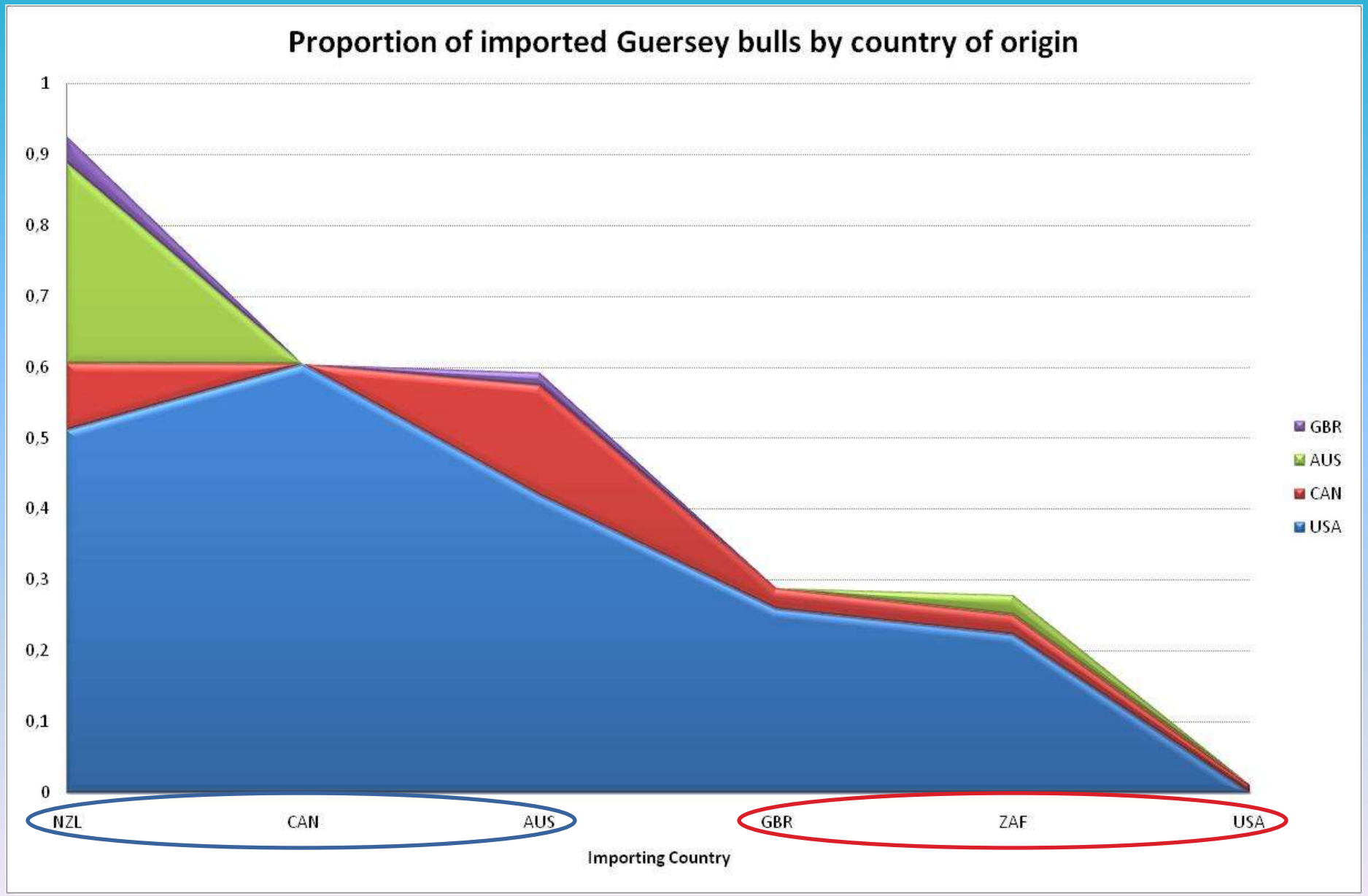



Market share of country of origin for imported Holstein bulls
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
AUS NZL ZAF NLD CHE CHR ESP FRA GBR BEL DEU IRL ISR CZE POL DFS ITA EST SVN HUN LVA SVK FRR USA CAN JPN
Importing Country
USA
NLD
CAN
DEU
FRA
ITA
DNK
Other

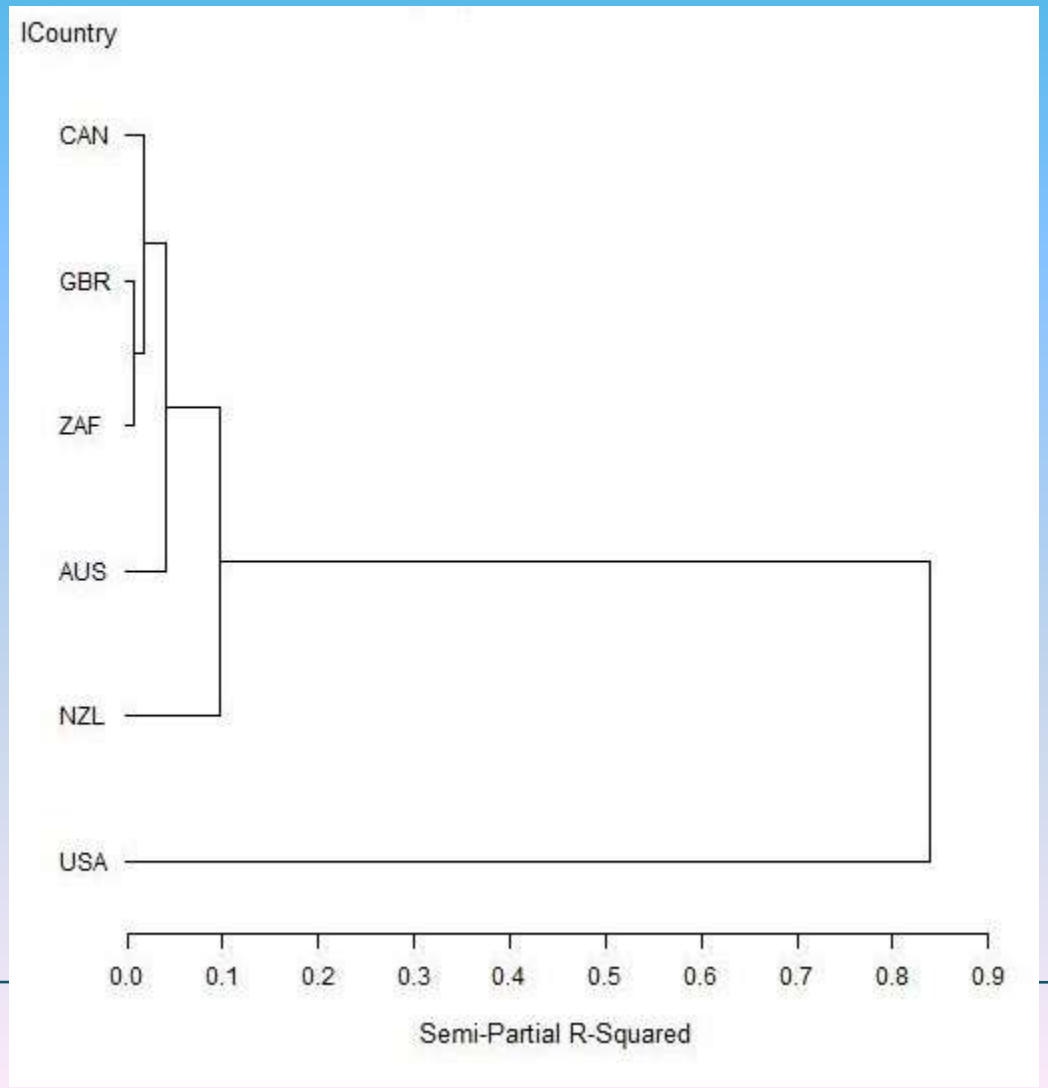
GUERNSEY

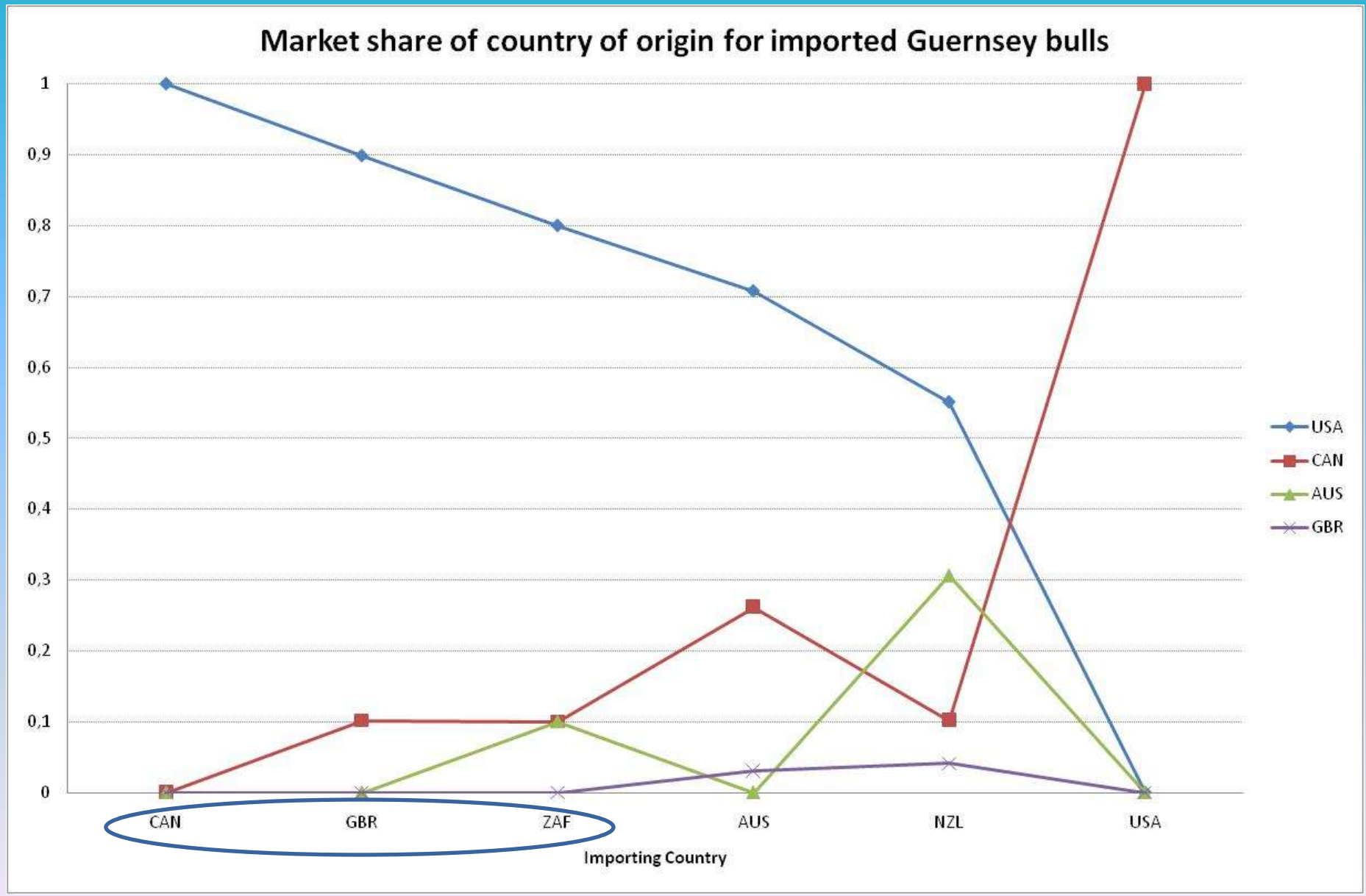
Cluster analysis: imported GUE bulls per country/total number of GUE bulls




Proportion of imported Guernsey bulls by country of origin
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
NZL
CAN
AUS
GBR
ZAF
USA
Importing Country
GBR
AUS
CAN
USA

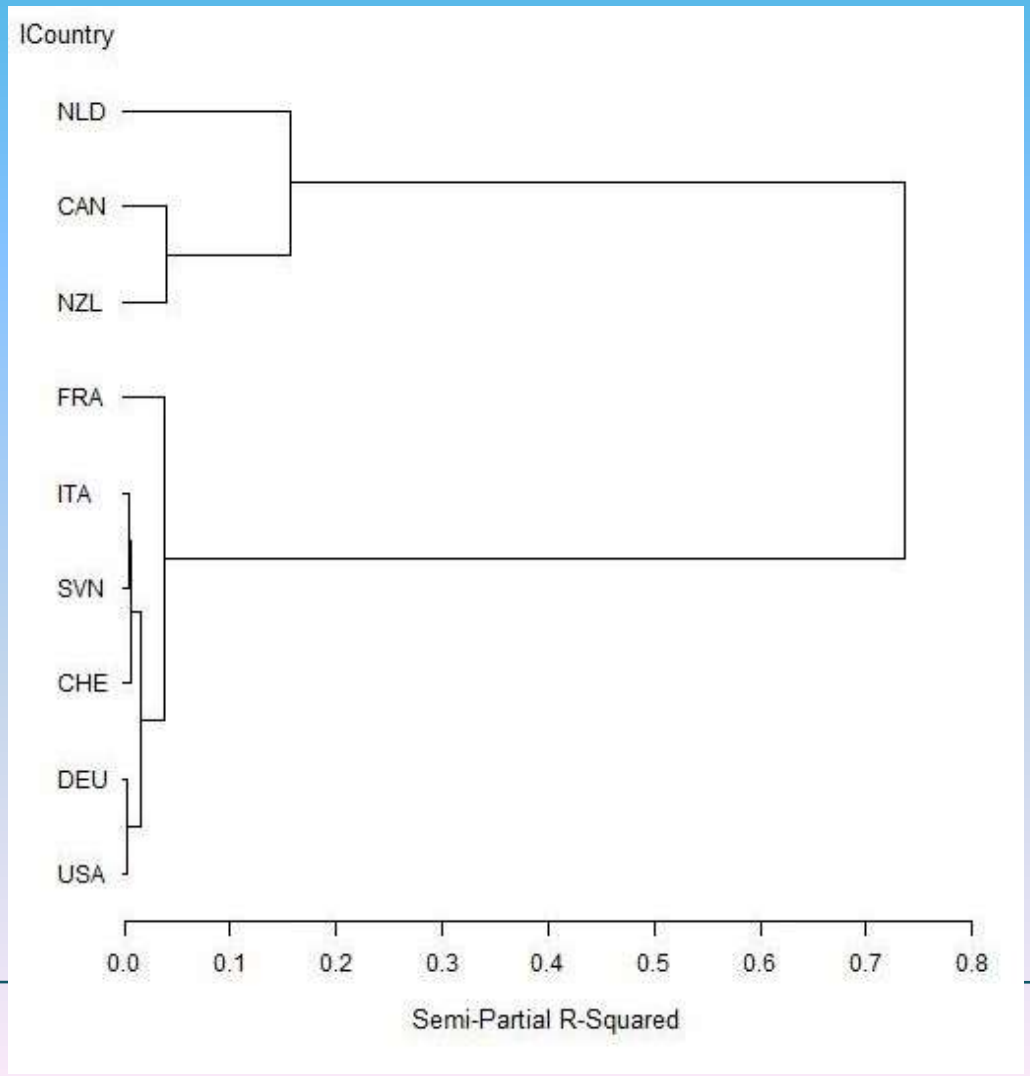
Cluster analysis: imported GUE bulls from a given origin/total number imported GUE bulls

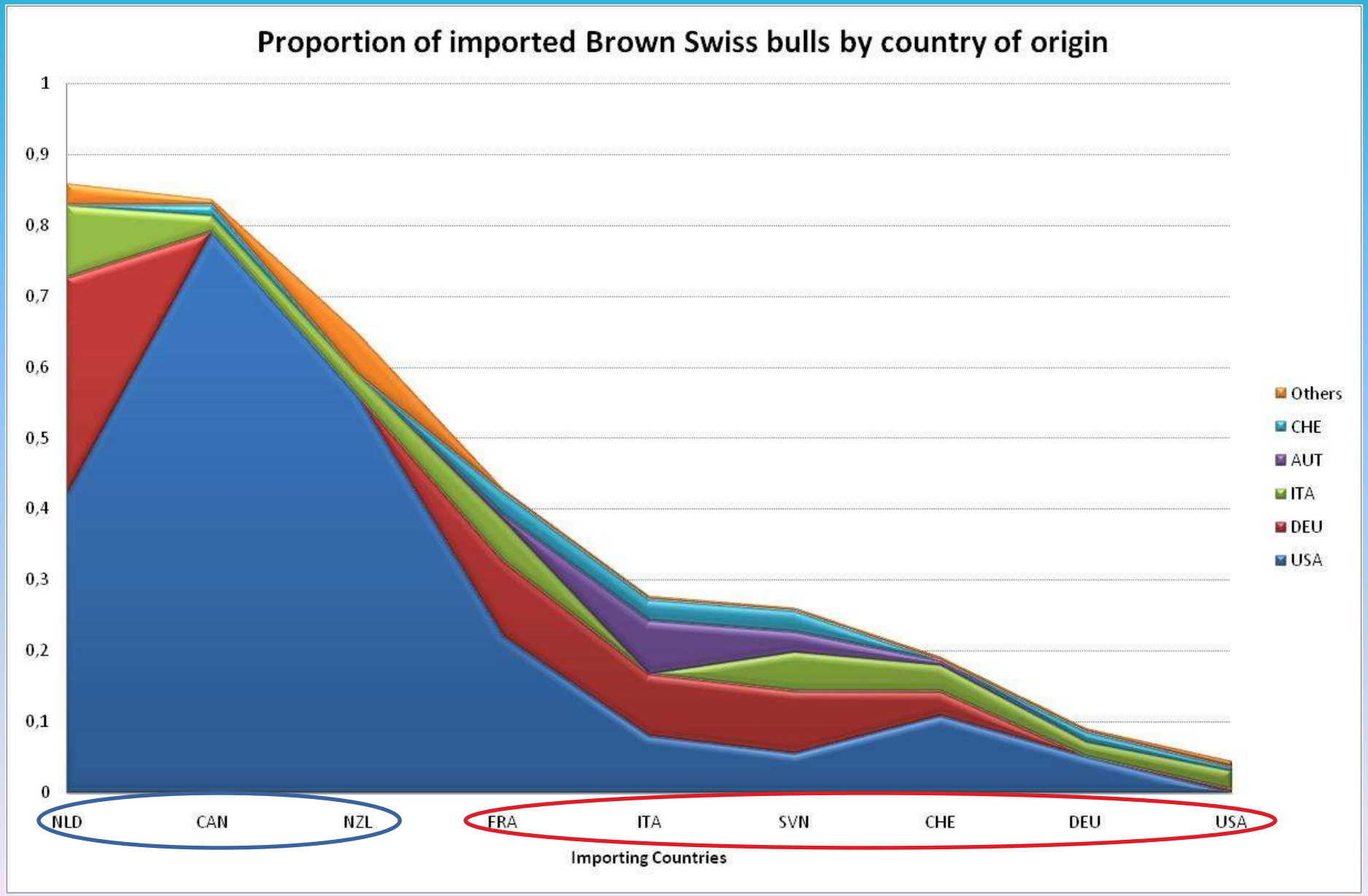



Market share of country of origin for imported Guernsey bulls
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
CAN
GBR
ZAF
AUS
NZL
USA
Importing Country
USA
CAN
AUS
GBR

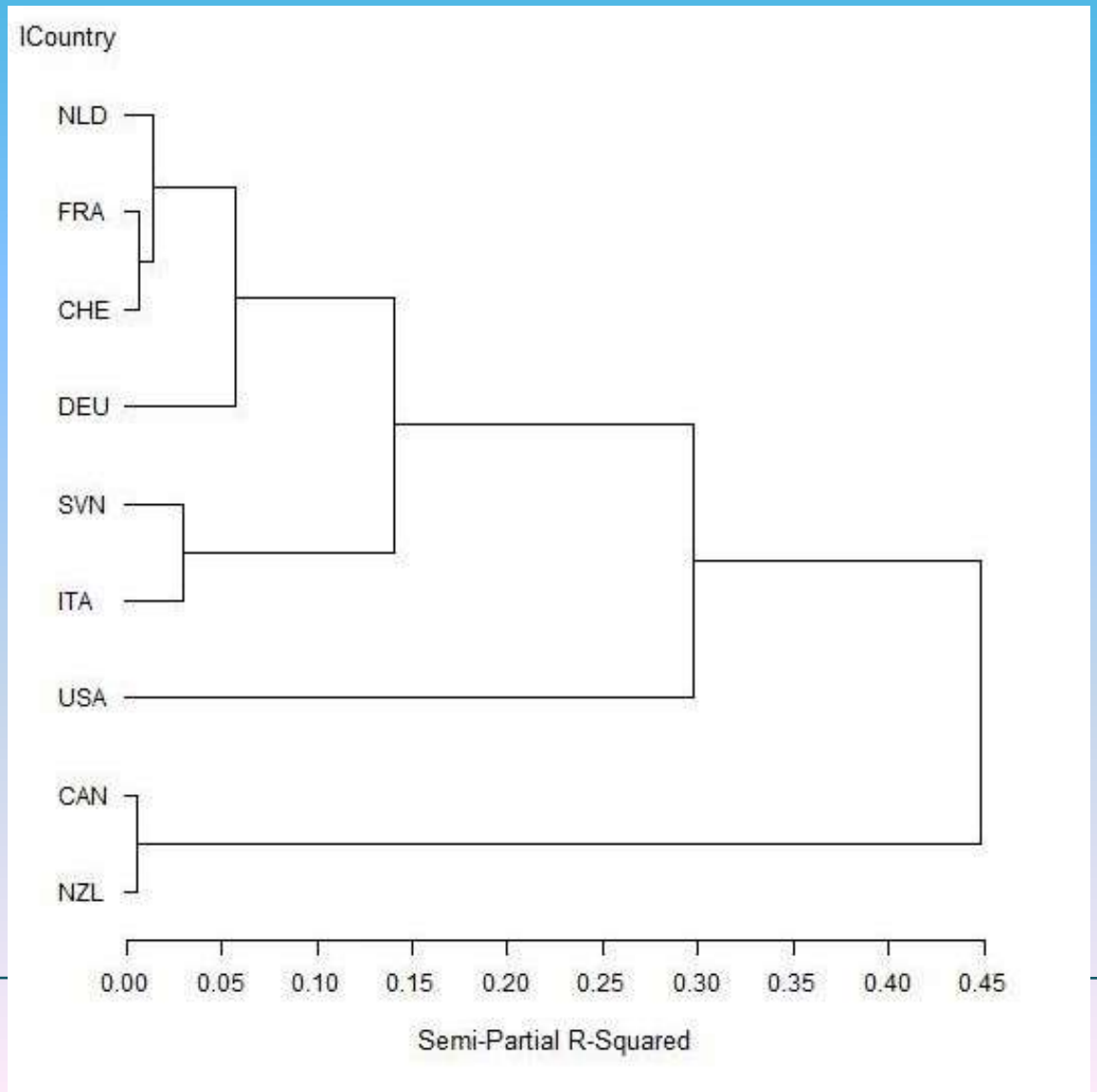
BROWN SWISS

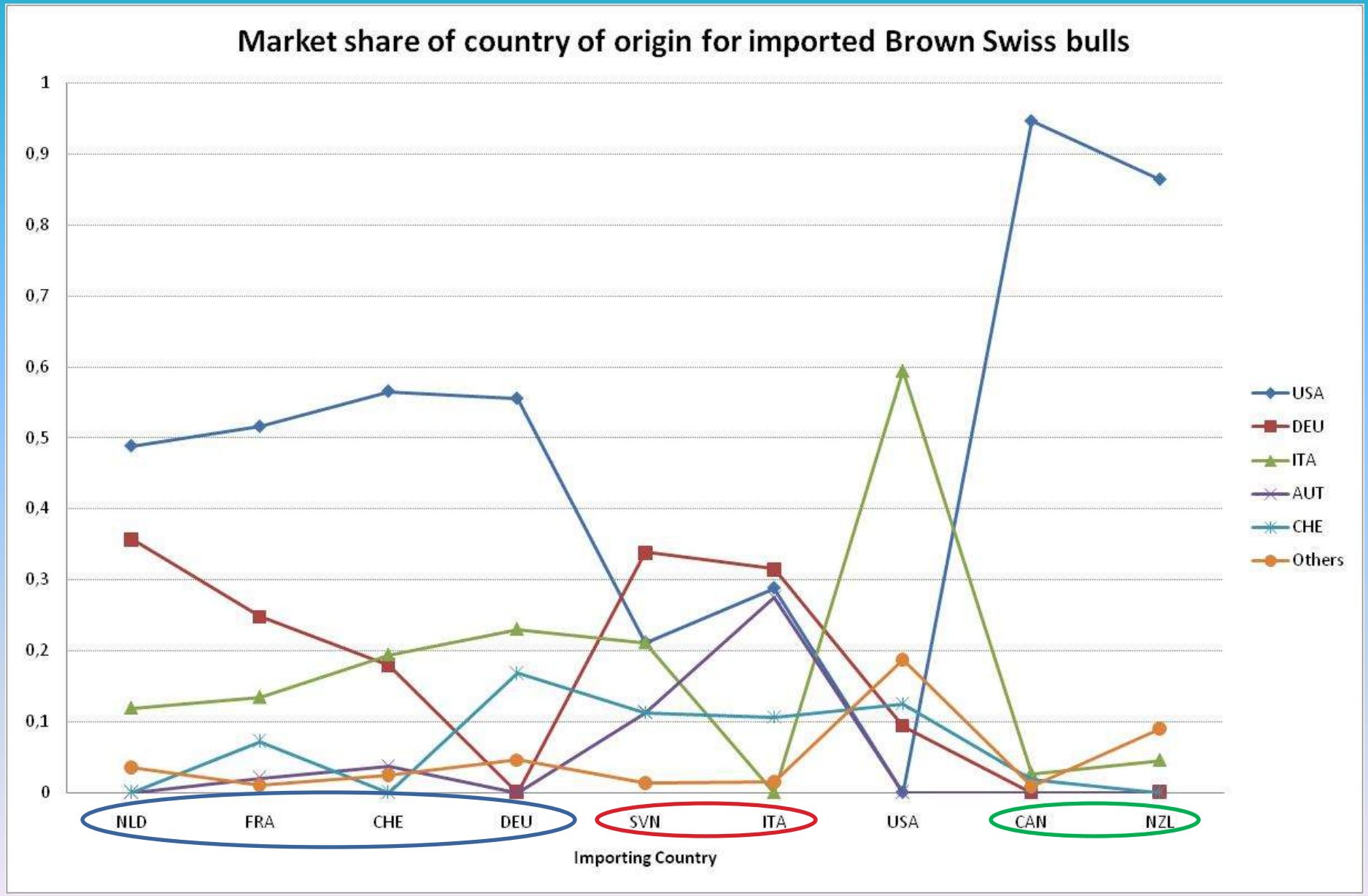
Cluster analysis: imported BSW bulls per country/total number of BSW bulls




Proportion of imported Brown Swiss bulls by country of origin
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
NLD
CAN
NZL
FRA
ITA
SVN
CHE
DEU
USA
Importing Countries
Others
CHE
AUT
ITA
DEU
USA

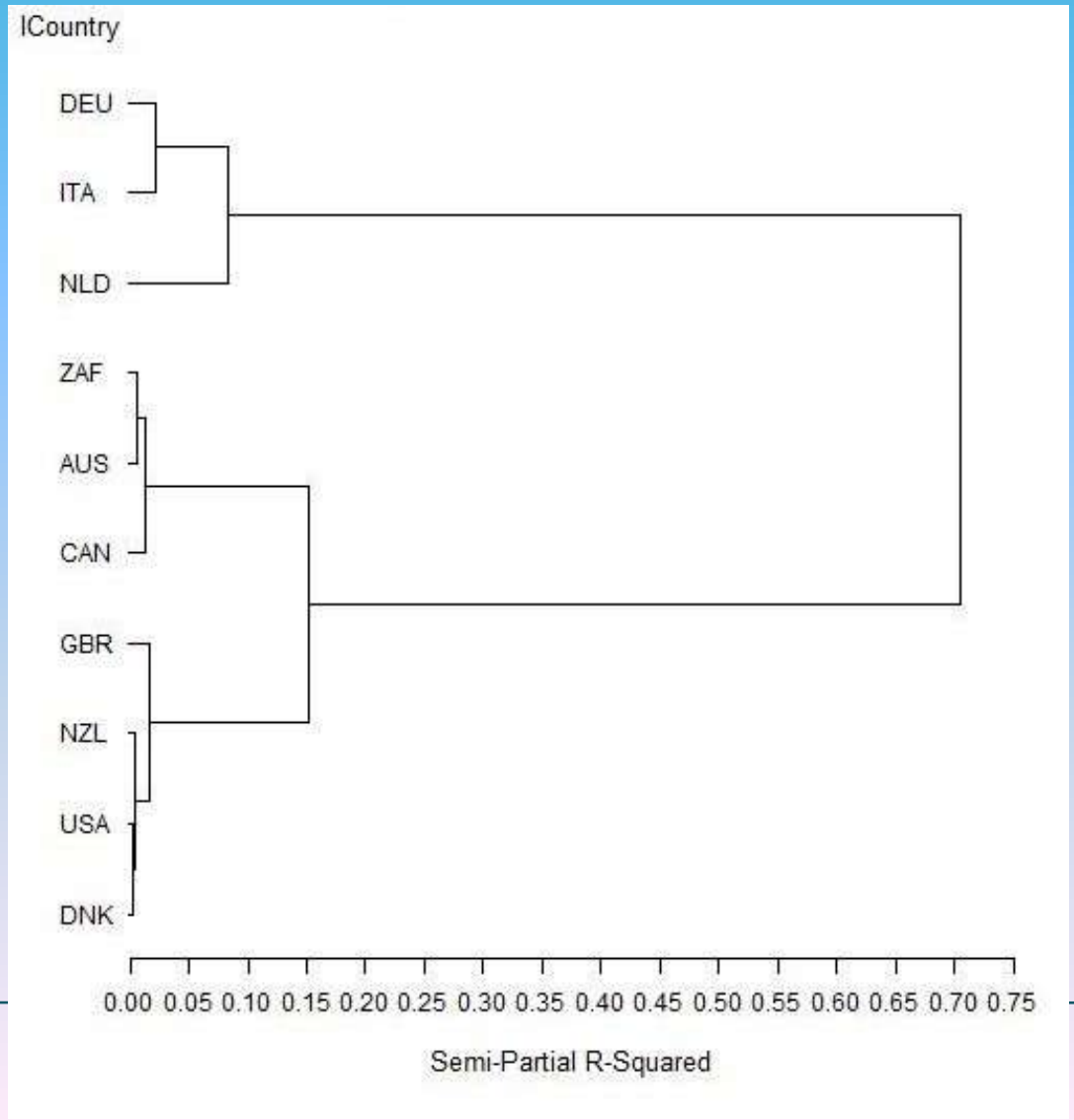
Cluster analysis: imported BSW bulls from a given origin/total number imported BSW bulls

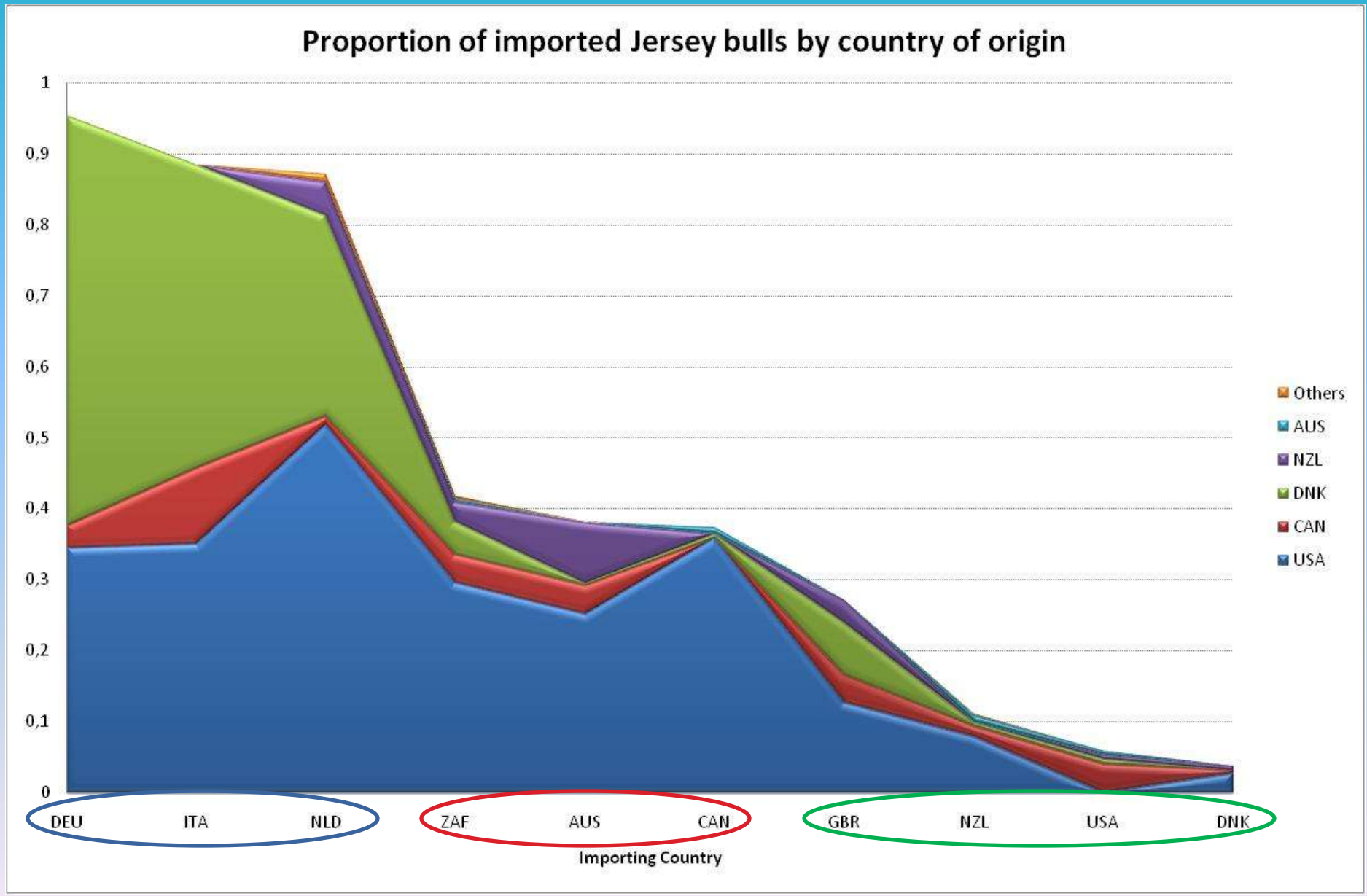



Market share of country of origin for imported Brown Swiss bulls
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
NLD
FRA
CHE
DEU
SVN
ITA
USA
CAN
NZL
Importing Country
USA
DEU
ITA
AUT
CHE
Others

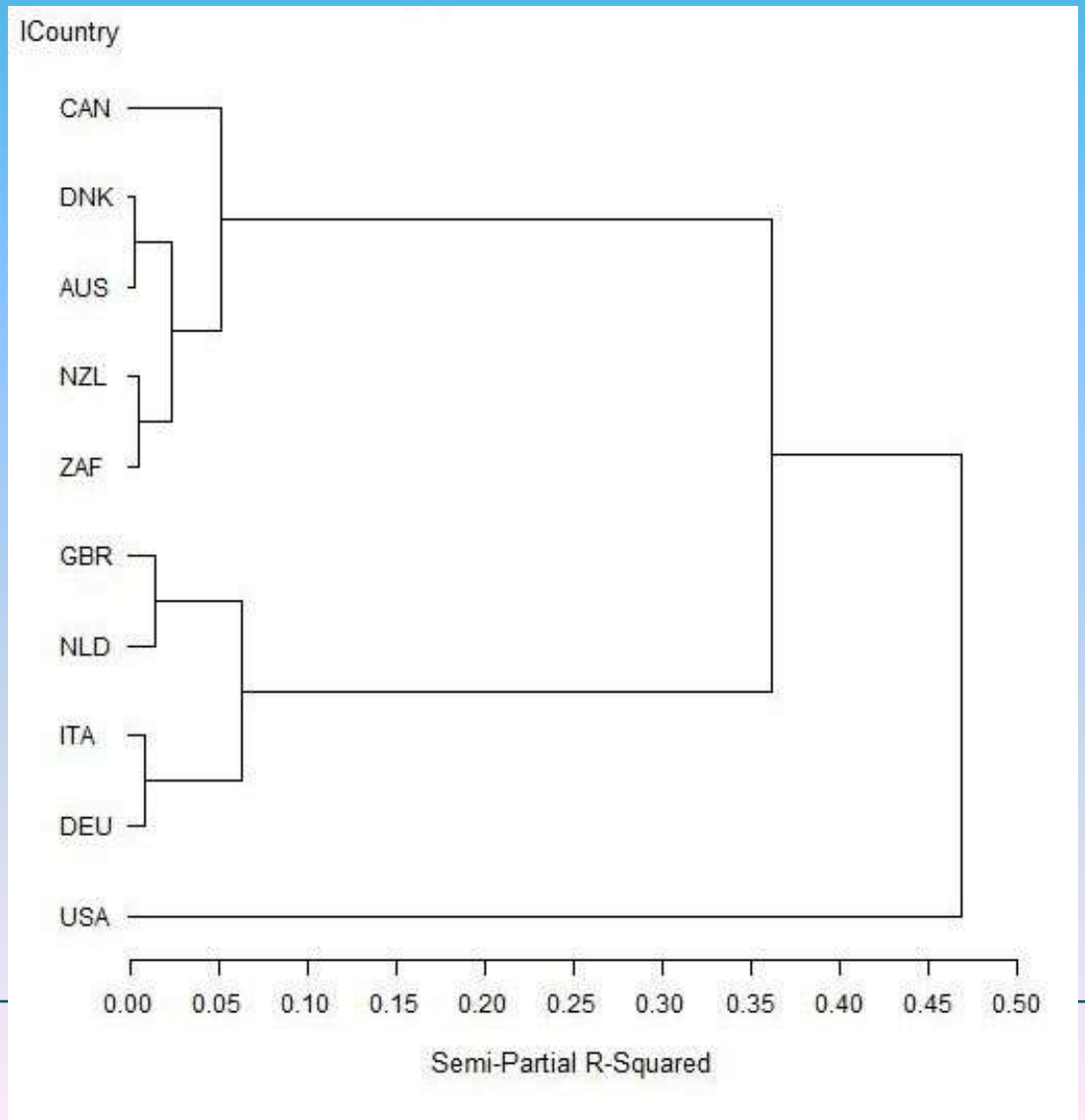
JERSEY

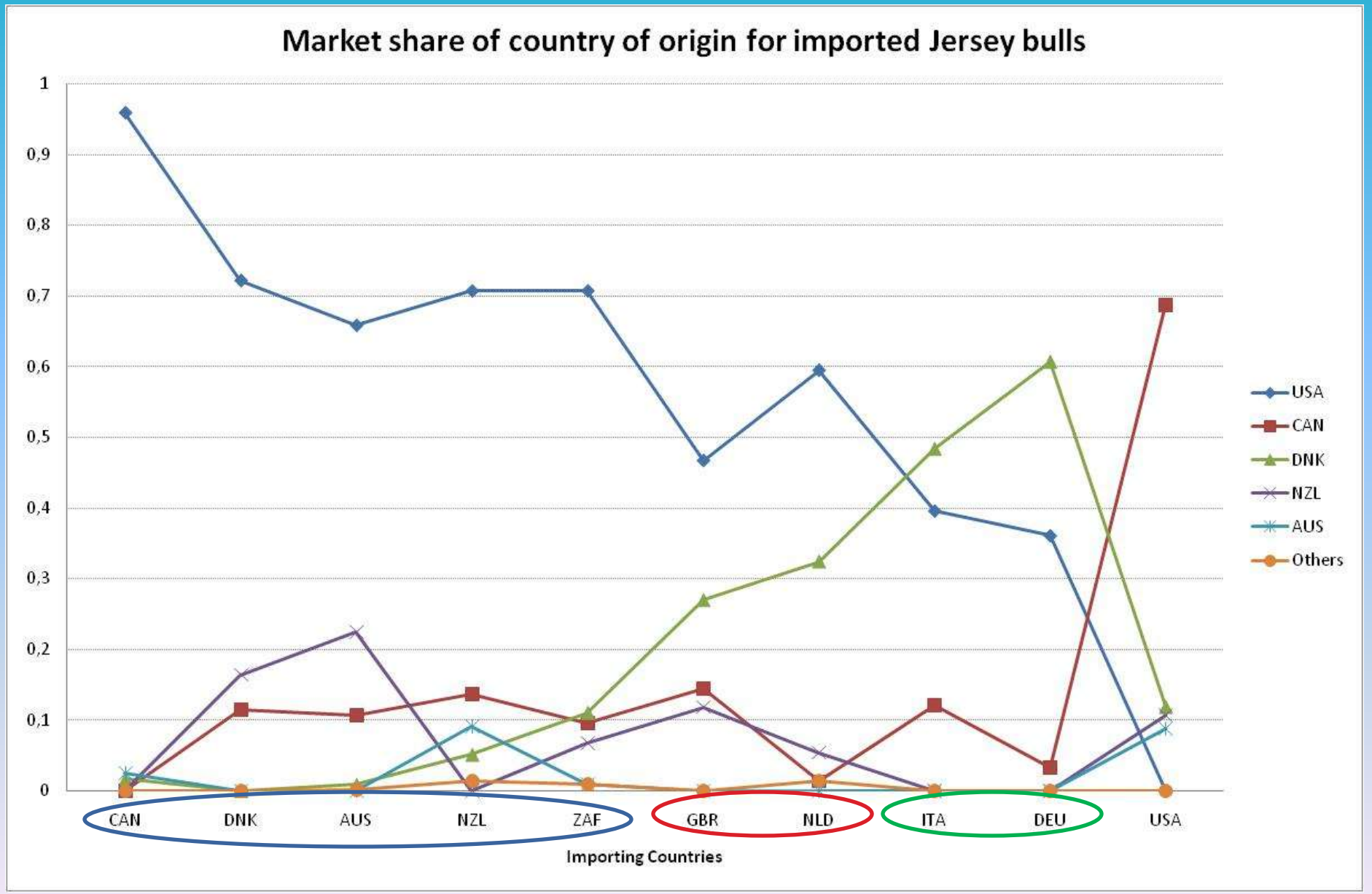
Cluster analysis: imported JER bulls per country/total number of JER bulls




Proportion of imported Jersey bulls by country of origin
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
DEU
ITA
NLD
ZAF
AUS
CAN
GBR
NZL
USA
DNK
Importing Country
Others
AUS
NZL
DNK
CAN
USA

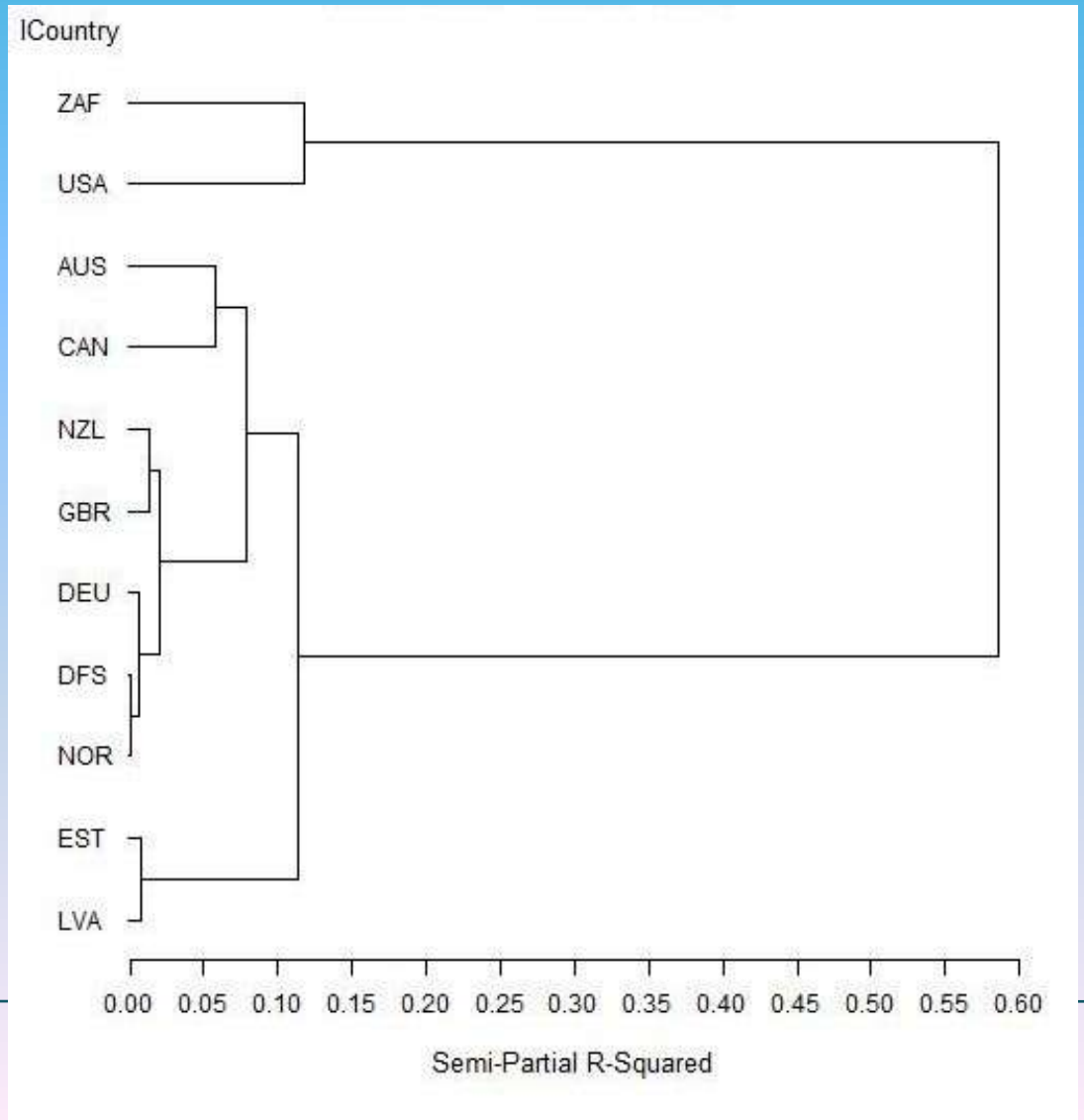
Cluster analysis: imported JER bulls from a given origin/total number imported JER bulls

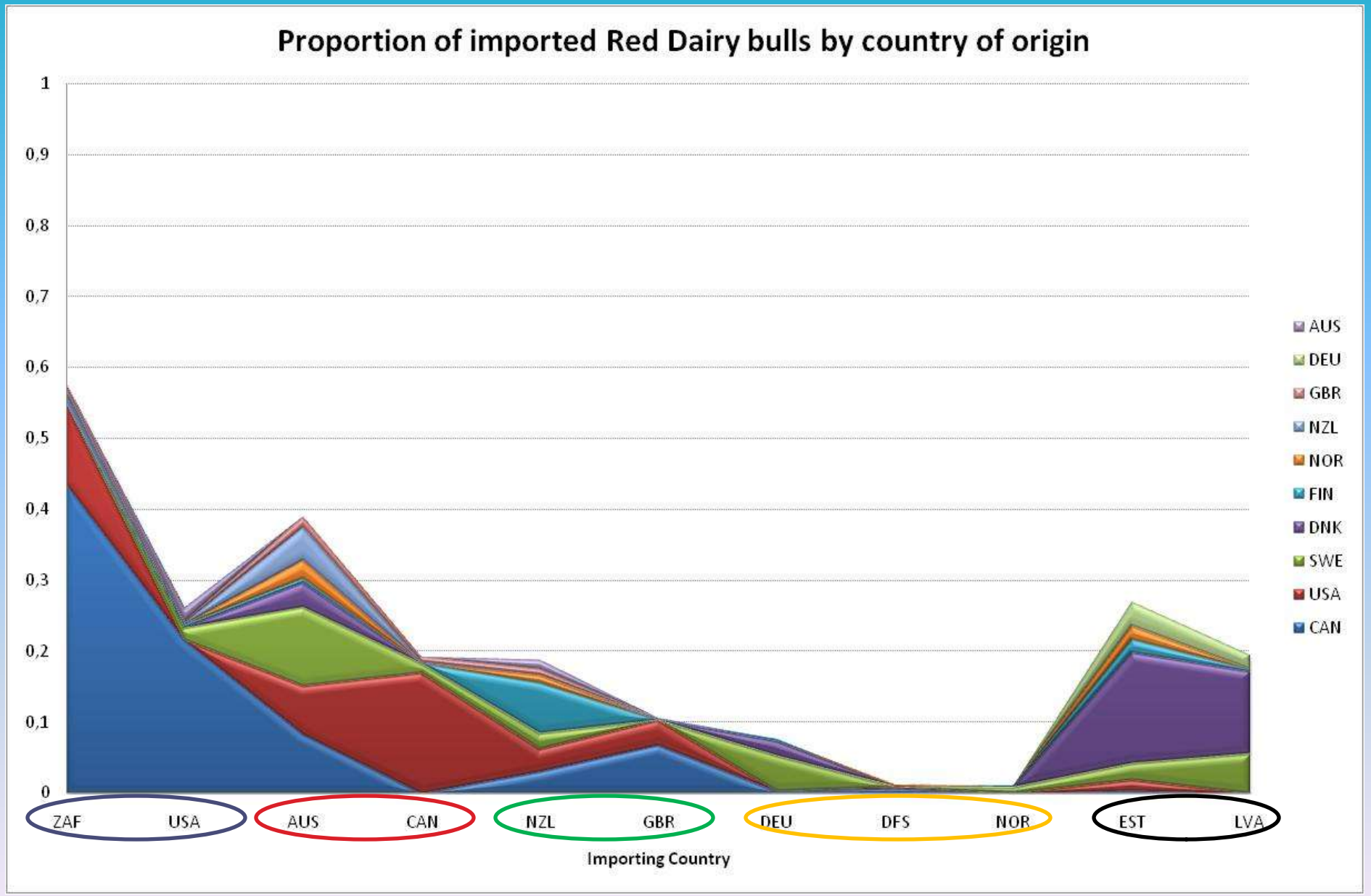



Market share of country of origin for imported Jersey bulls
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
CAN
DNK
AUS
NZL
ZAF
GBR
NLD
ITA
DEU
USA
Importing Countries
USA
CAN
DNK
NZL
AUS
Others

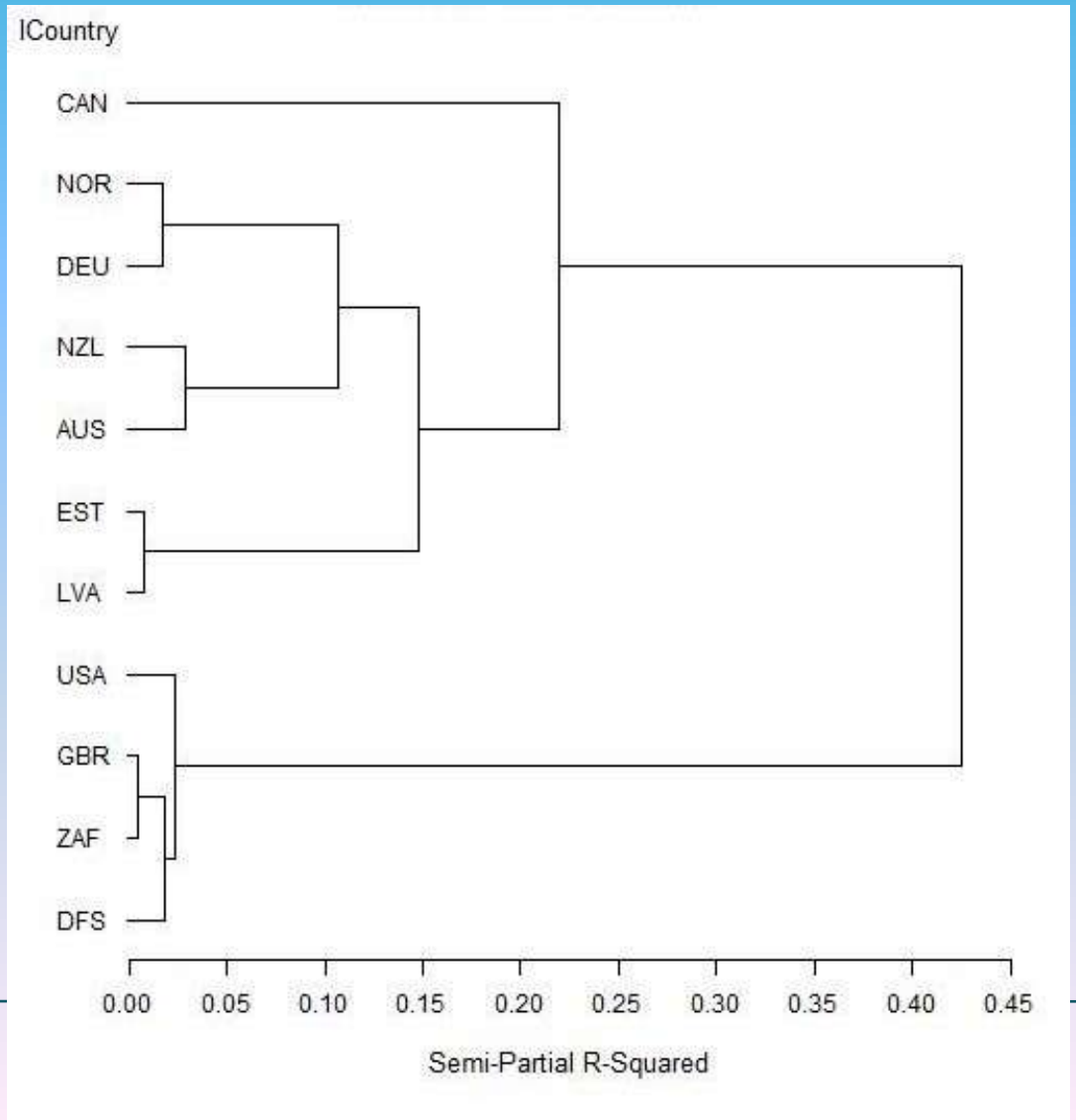
RED DAIRY CATTLE

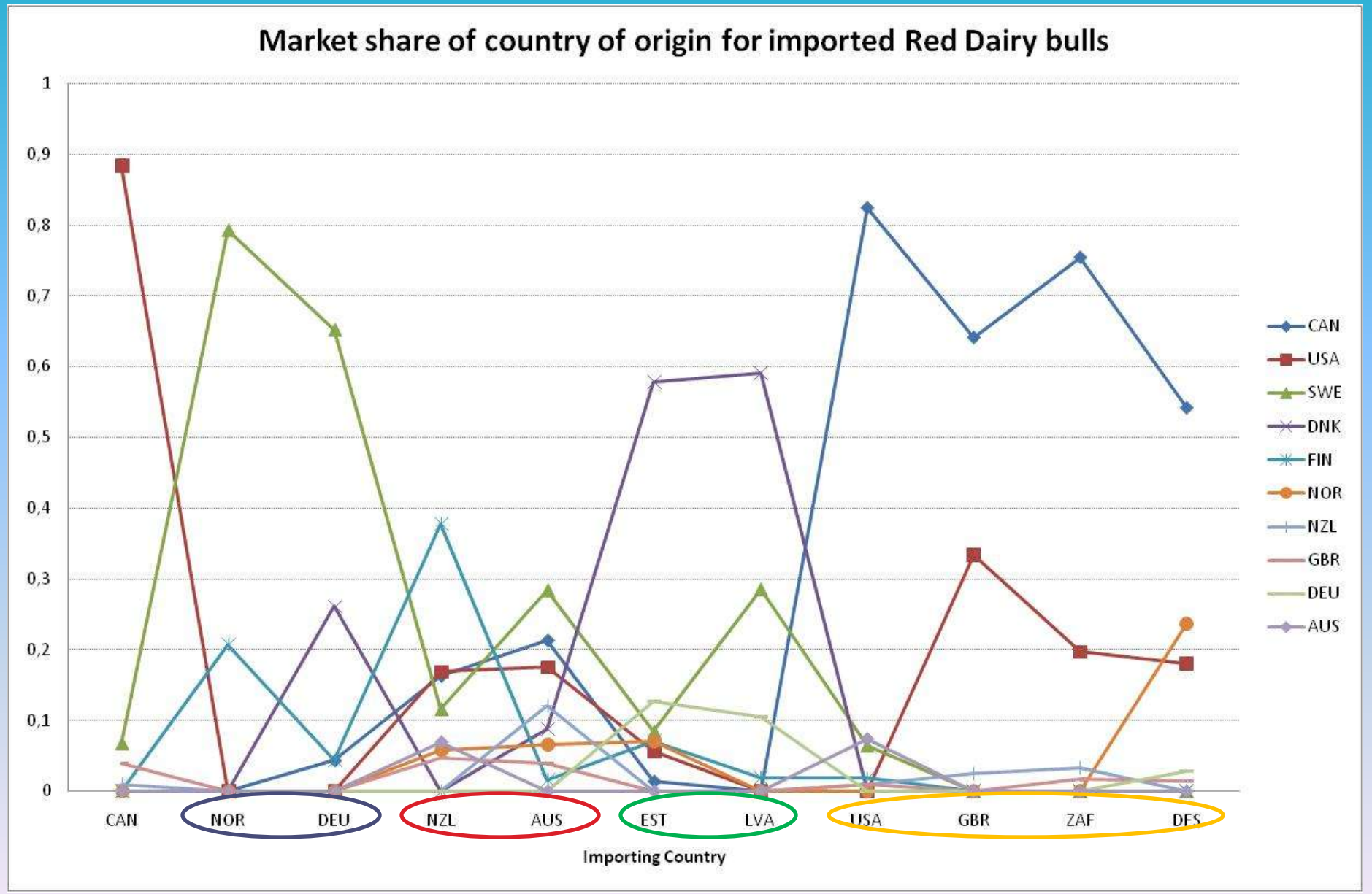
Cluster analysis: imported RDC bulls per country/total number of RDC bulls




Proportion of imported Red Dairy bulls by country of origin
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
AUS
DEU
GBR
NZL
NOR
FIN
DNK
SWE
USA
CAN
ZAF
USA
AUS
CAN
NZL
GBR
DEU
DFS
NOR
EST
LVA
Importing Country

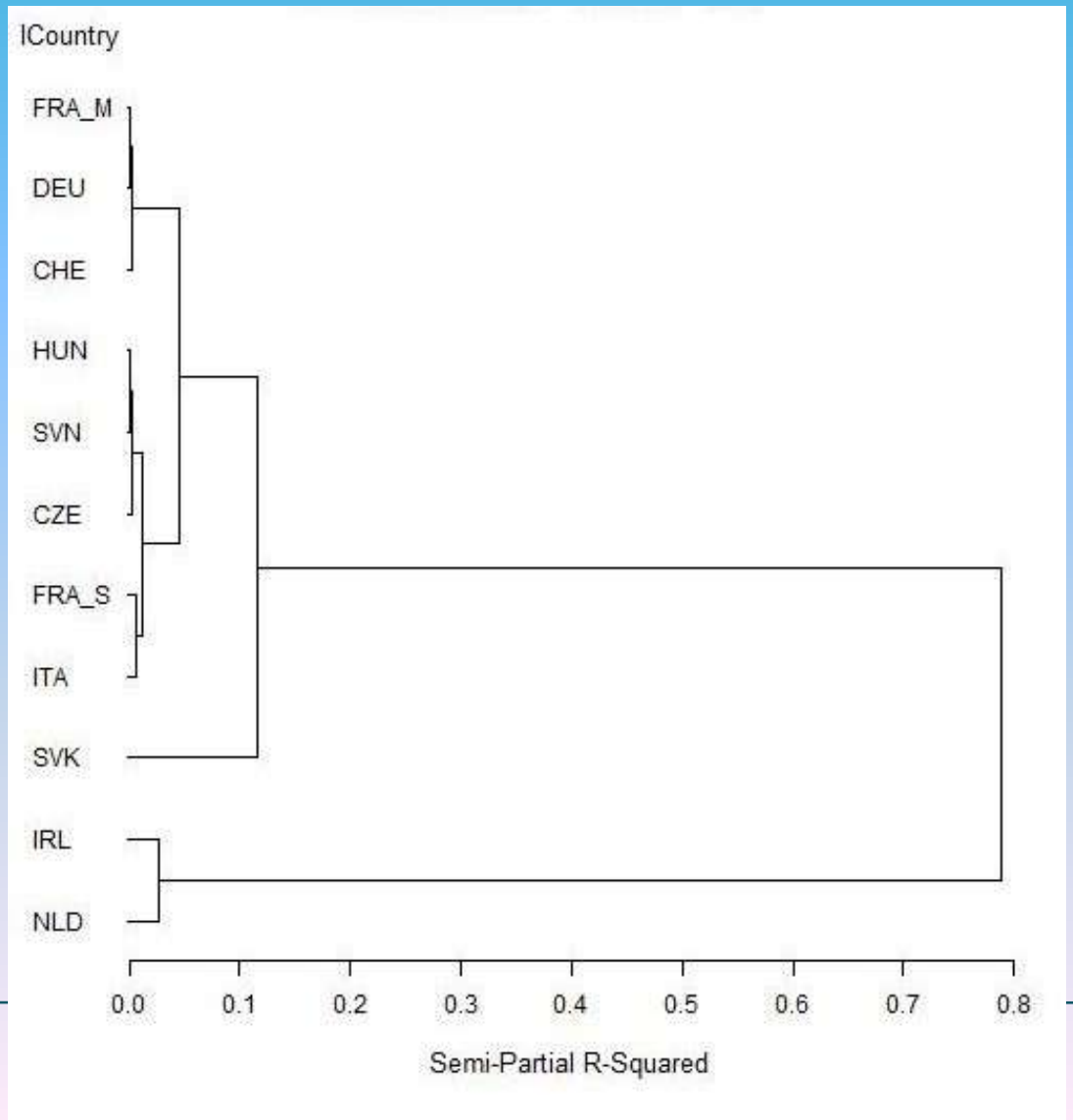
Cluster analysis: imported RDC bulls from a given origin/total number imported RDC bulls

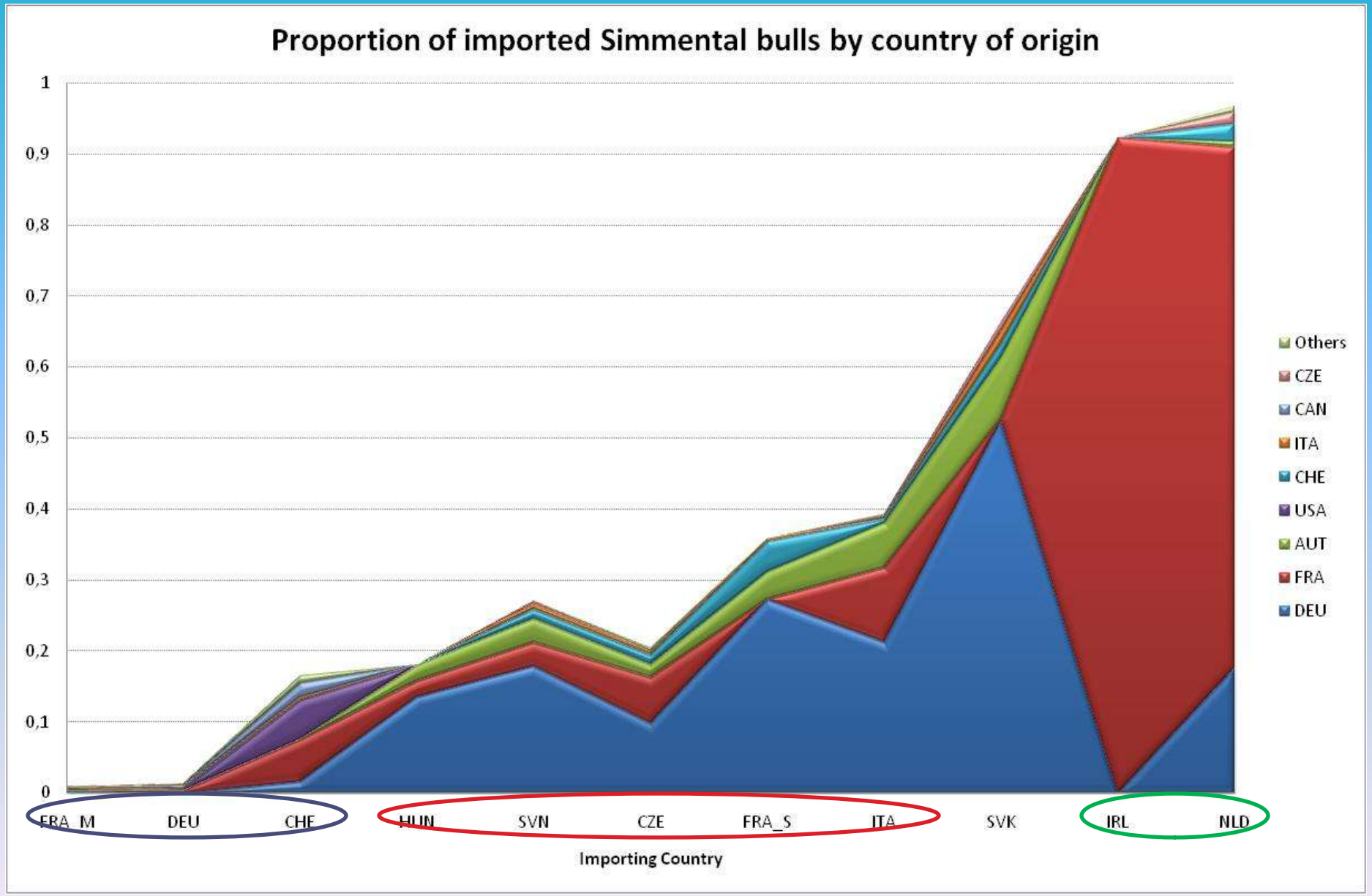



Market share of country of origin for imported Red Dairy bulls
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
CAN
NOR
DEU
NZL
AUS
EST
LVA
USA
GBR
ZAF
DFS
Importing Country
CAN
USA
SWE
DNK
FIN
NOR
NZL
GBR
DEU
AUS

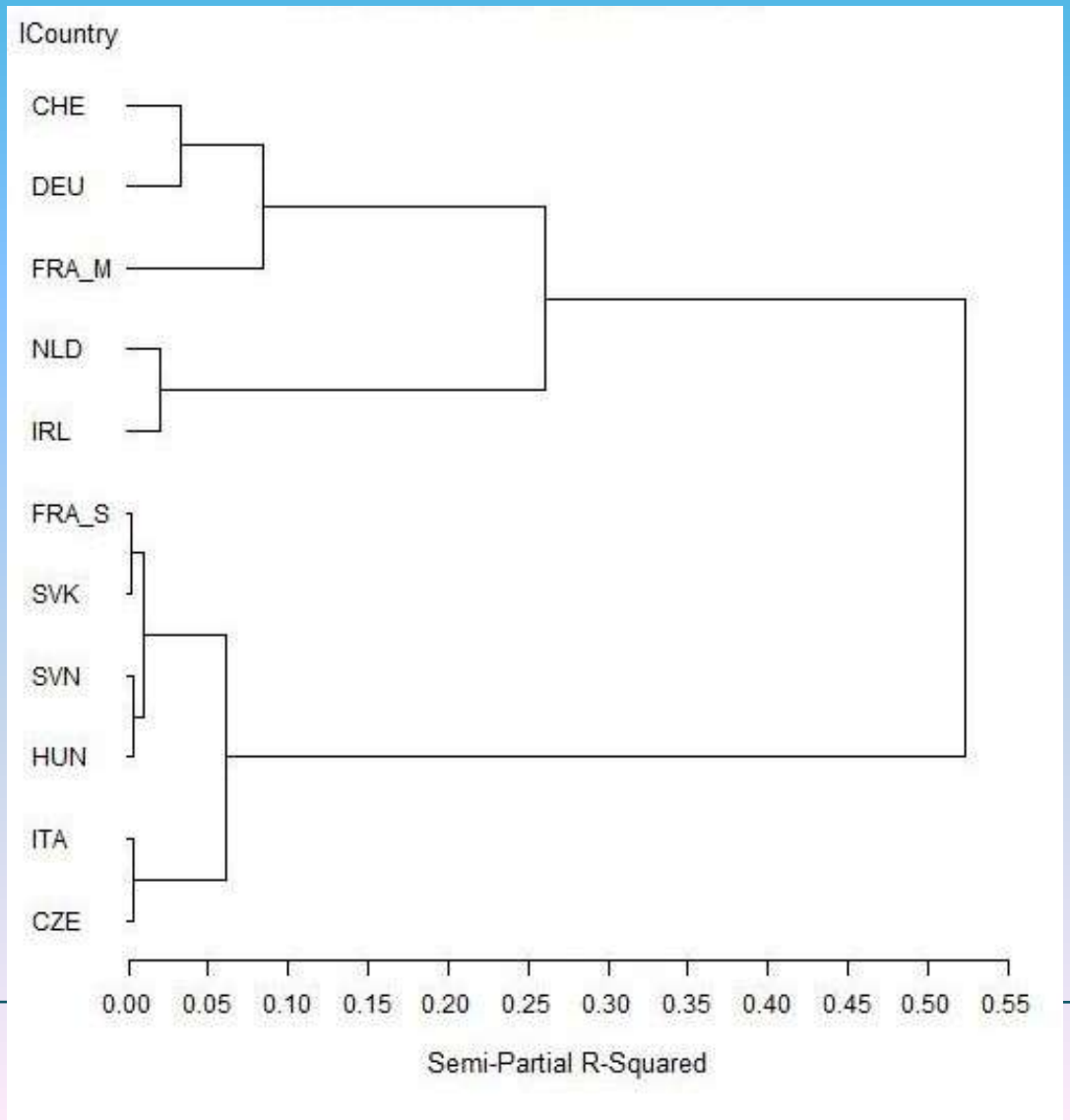
SIMMENTAL

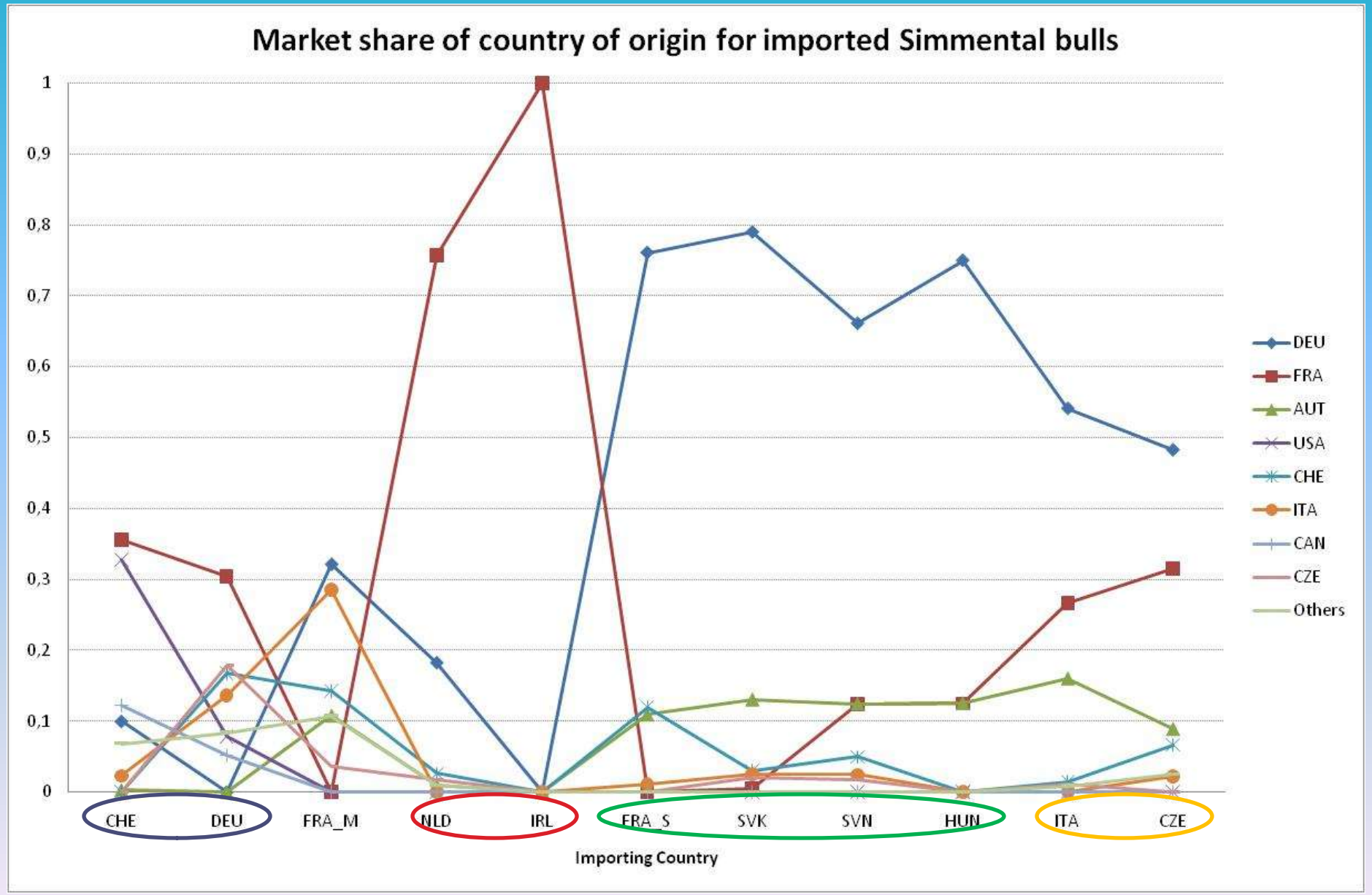
Cluster analysis: imported Simmental bulls per country/total number of Simmental bulls




Proportion of imported Simmental bulls by country of origin
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
FRA_M
DEU
CHE
HUN
SVN
CZE
FRA_S
ITA
SVK
IRL
NLD
Importing Country
Others
CZE
CAN
ITA
CHE
USA
AUT
FRA
DEU

Cluster analysis: imported Simmental bulls from a given origin/total number imported Simmental bulls




Market share of country of origin for imported Simmental bulls
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
CHE
DEU
FRA_M
NLD
IRL
FRA_S
SVK
SVN
HUN
ITA
CZE
Importing Country
DEU
FRA
AUT
USA
CHE
ITA
CAN
CZE
Others

Conclusions

- Methodology allowed clear distinction between heavy, medium and small importers and also indicated the country profiles regarding the preferred origin of the imports.
- Red dairy breeds practice the lowest amount of trading (7.8%), while Holstein is the breed with the largest proportion of imported bulls (24.9%)
- USA are consistently the largest exporters of dairy genetics across all but Simmental and the red breeds, followed by the Netherlands, Canada, Germany and France
- Heavy importers (more than 80% of imported bulls in at least one breed) were Belgium, Canada, Germany, Ireland, Italy, the Netherlands, New Zealand and Slovakia
- Groups created by the cluster analysis showed that importing country profile is influenced by region and production system.

Country profiles regarding the use of imported dairy bulls

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