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Genetic conditions of joint Nordic genetic evaluations of lifetime competition performance in Warmblood sport horses

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Aim of this study

Investigate opportunities for joint Nordic genetic evaluation of competition performance with use of raw data from each country by studying:

- Defining data and models for genetic evaluation
- Genetic correlation between traits in the different countries
- Accuracies of EBVs and no of stallions with EBVs

Competition performance

- Definition: lifetime accumulated points in each discipline transformed with 10-log
- Points reflect:
  - Placing
  - Level of competition
- Data editing:
  - Adding points to horses with placings (NOR)
  - Exclusion of zeros

Competition data

Trait	N	Mean	SD
Show jumping			
SWE	22992	1.42	0.67
DEN	15141	1.57	0.75
NOR	3094	1.47	0.53
FIN	3376	1.31	0.67
Dressage			
SWE	10768	1.38	0.67
DEN	14608	1.38	0.67
NOR	1873	1.27	0.52
FIN	2112	1.26	0.63

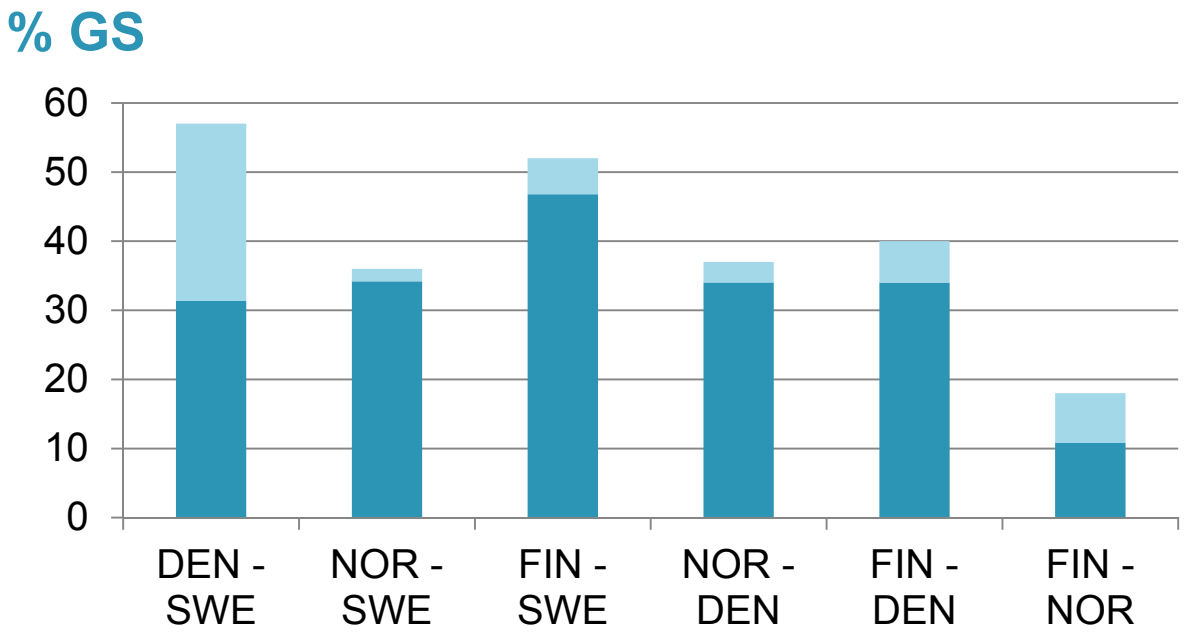
Pedigree data

- 229 163 horses in joint pedigree
- Pedigree Completeness Index

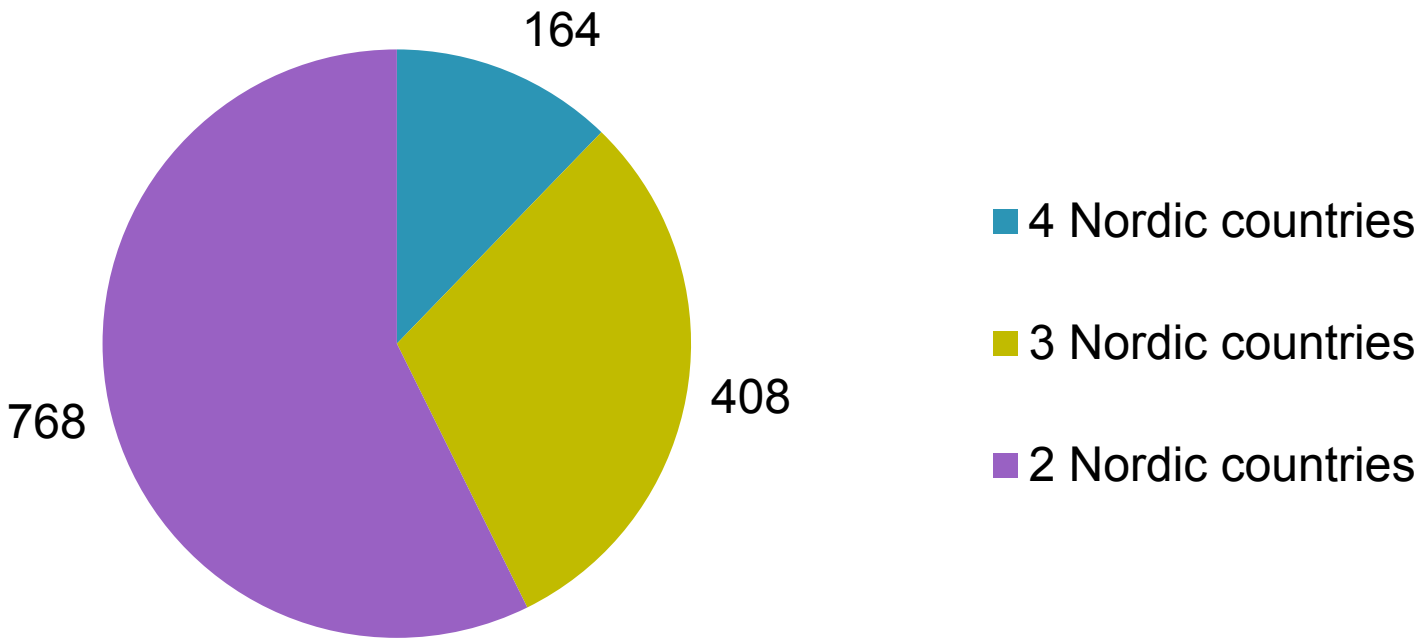
Country	PEC
SWE	0.90
DEN	0.67
NOR	0.27
FIN	0.84

Genetic similarity

’Proportion of competing progenies by stallions having competing progenies in two countries, relative to the total number of competing progenies in both countries’



1340 stallions have competing offspring in more than one Nordic country



Statistical models

Univariate analyses within, and bivariate analyses between countries

$$y_{ijk} = \text{birth year} + sex_j + horse_k + e_{ijk}$$

Univariate analysis total data

$$y_{ijk} = \text{birth year*country} + sex_j + horse_k + e_{ijk}$$

Heritabilities

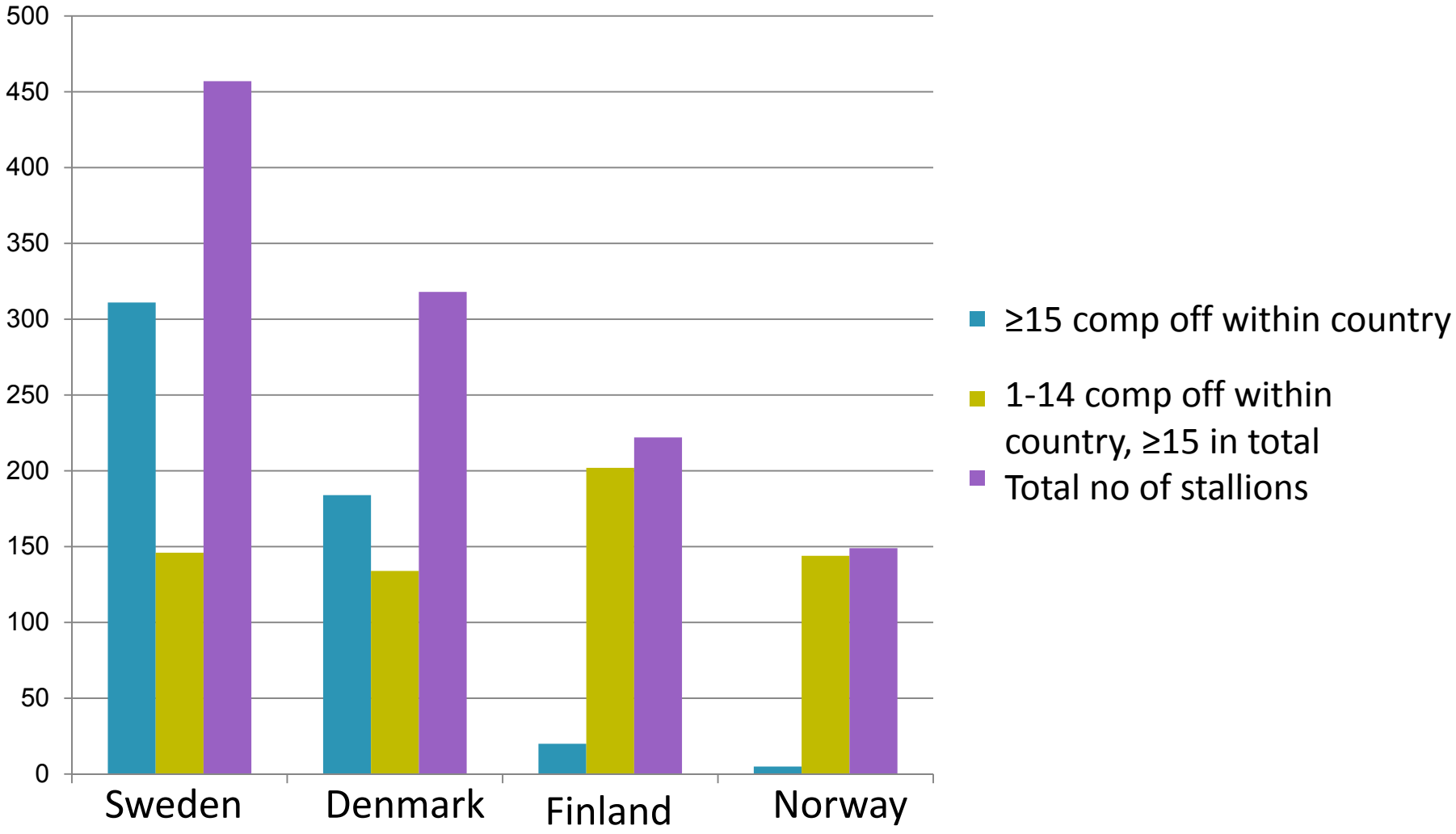
Country	Show jumping	Dressage
SWE	0.32	0.19
DEN	0.25	0.14
NOR	0.31	0.55
FIN	0.42	0.42
SWE-DEN-NOR-FIN	0.27	0.15

Genetic correlations

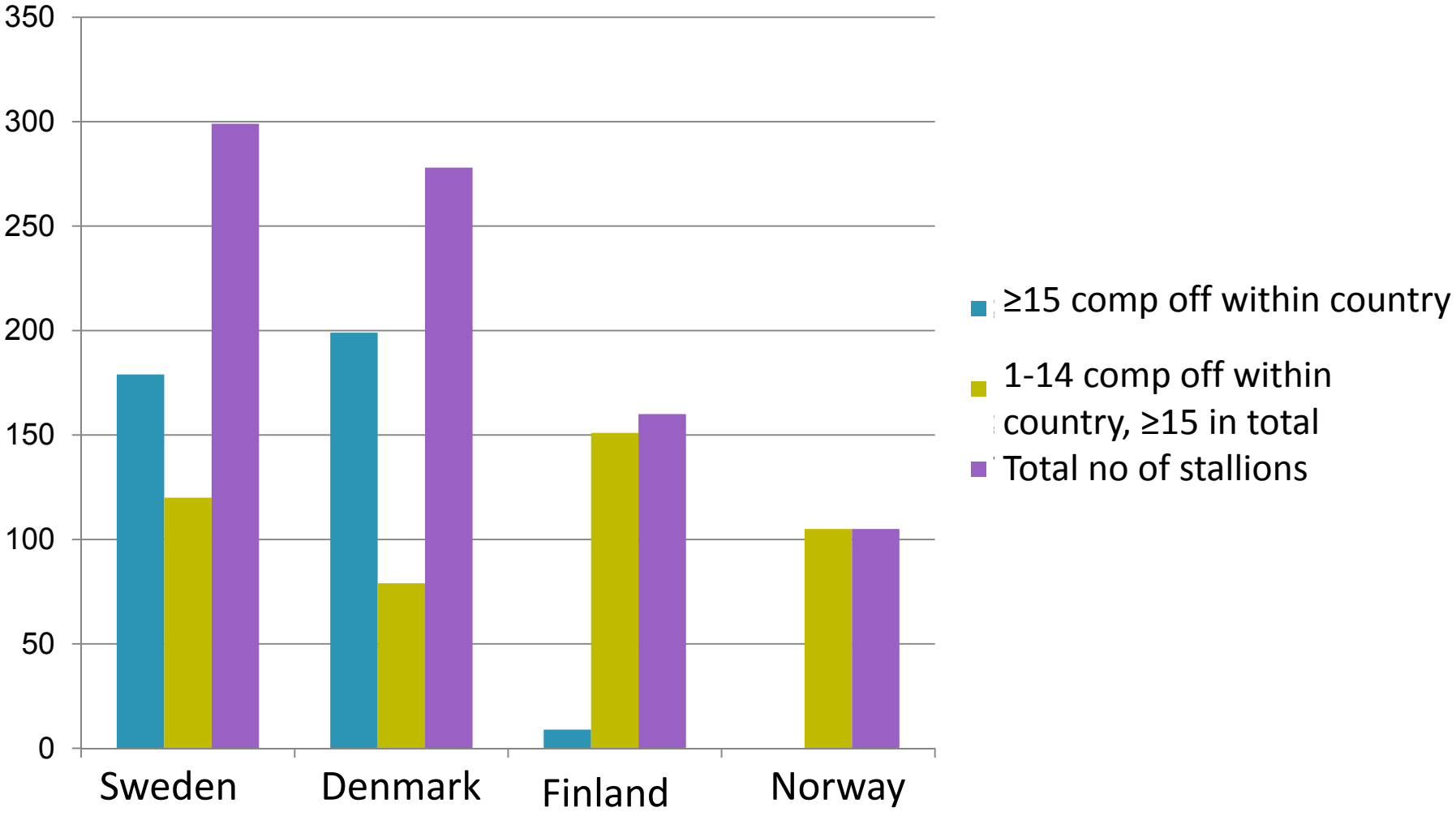
Countries	Show jumping	Dressage
SWE – DEN	0.99*	0.94
SWE – NOR	0.98	0.99*
SWE – FIN	0.82	0.63
DEN – NOR	0.73	0.99*
DEN – FIN	0.78	0.99*
NOR - FIN	0.95	0.99*

* Lower convergence criteria

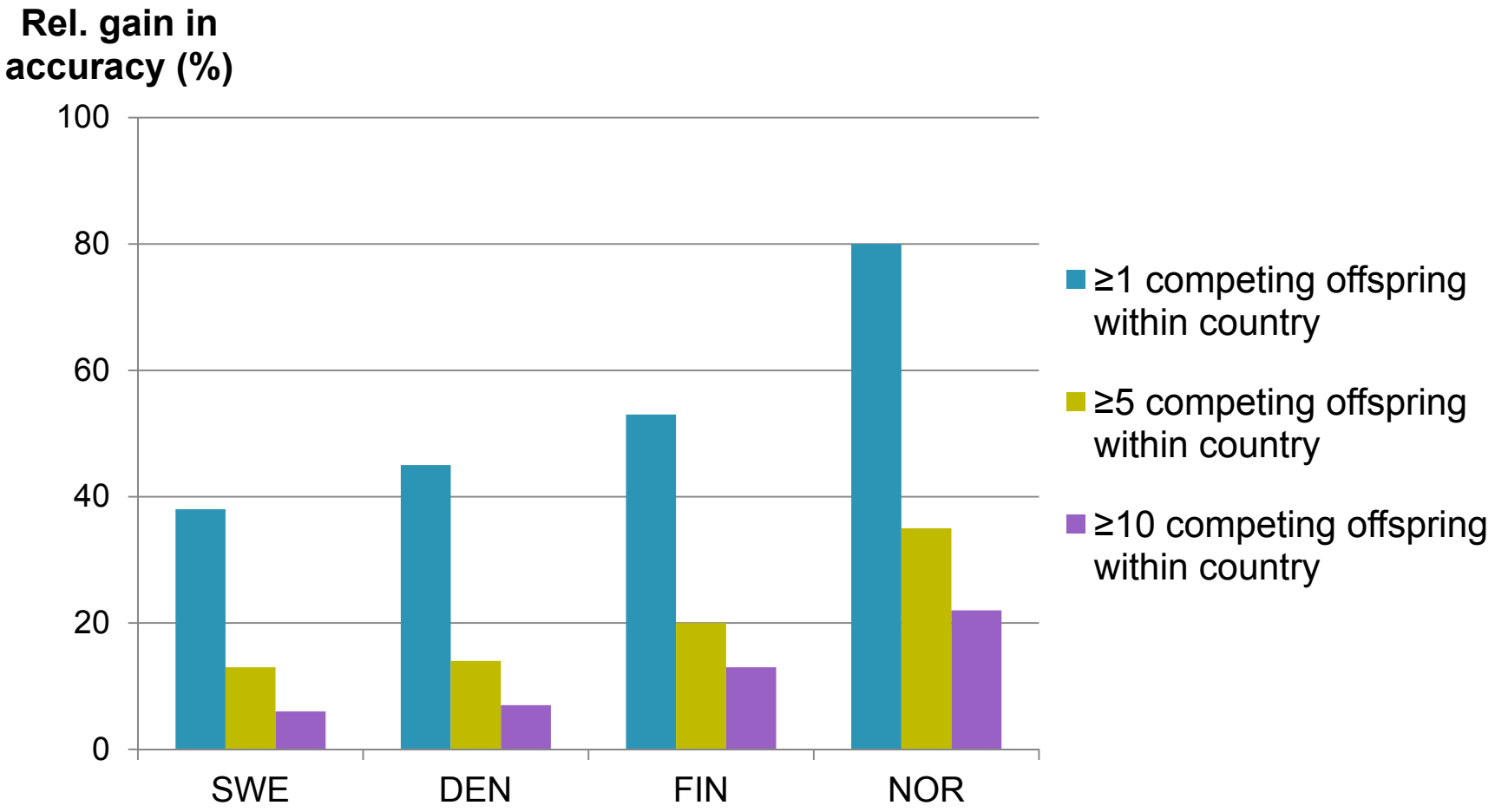
No of stallions with a Nordic index for show jumping



No of stallions with a Nordic index for dressage



Relative gain in accuracy for EBVs for stallions estimated with national or Nordic data



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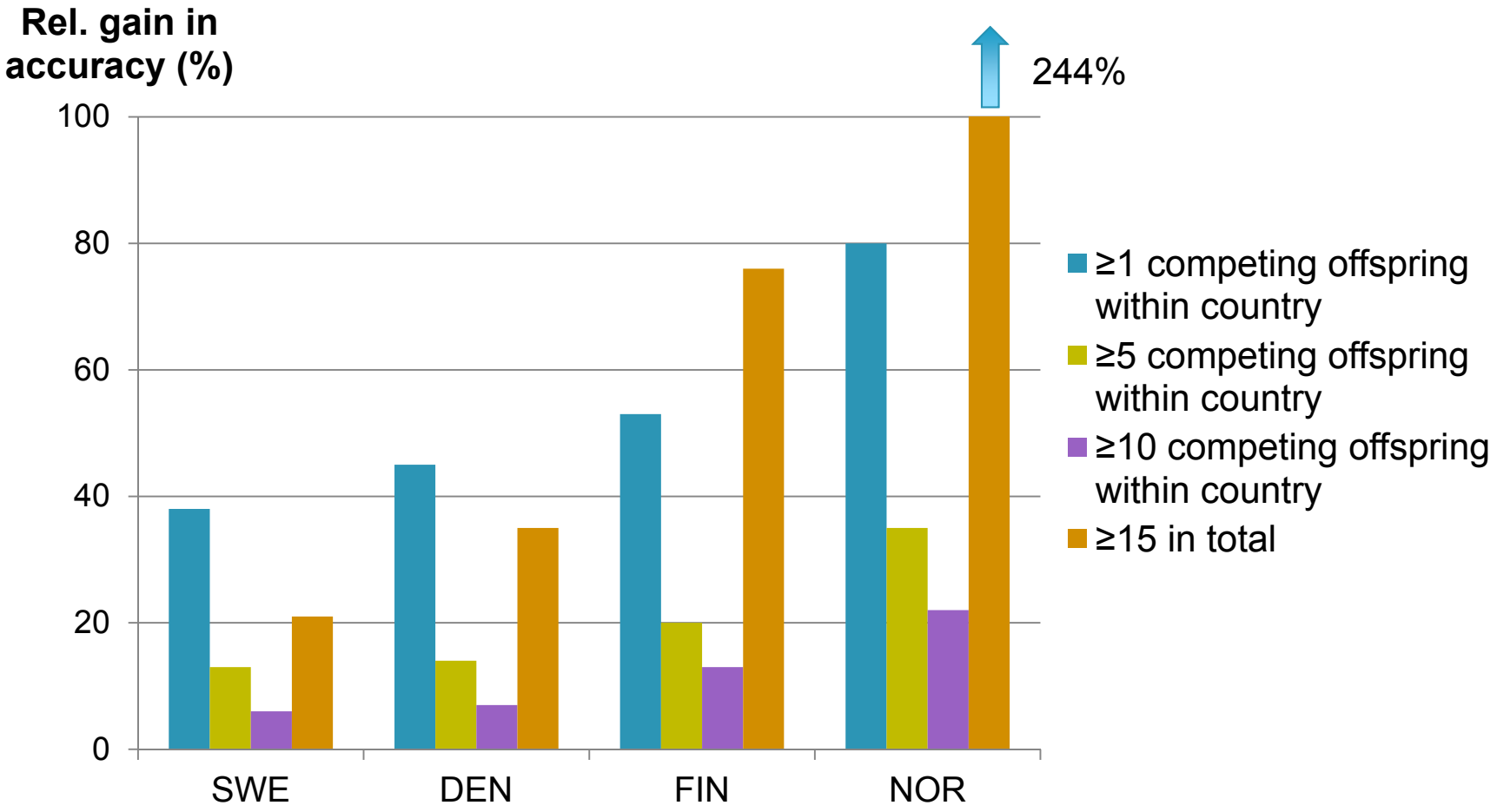

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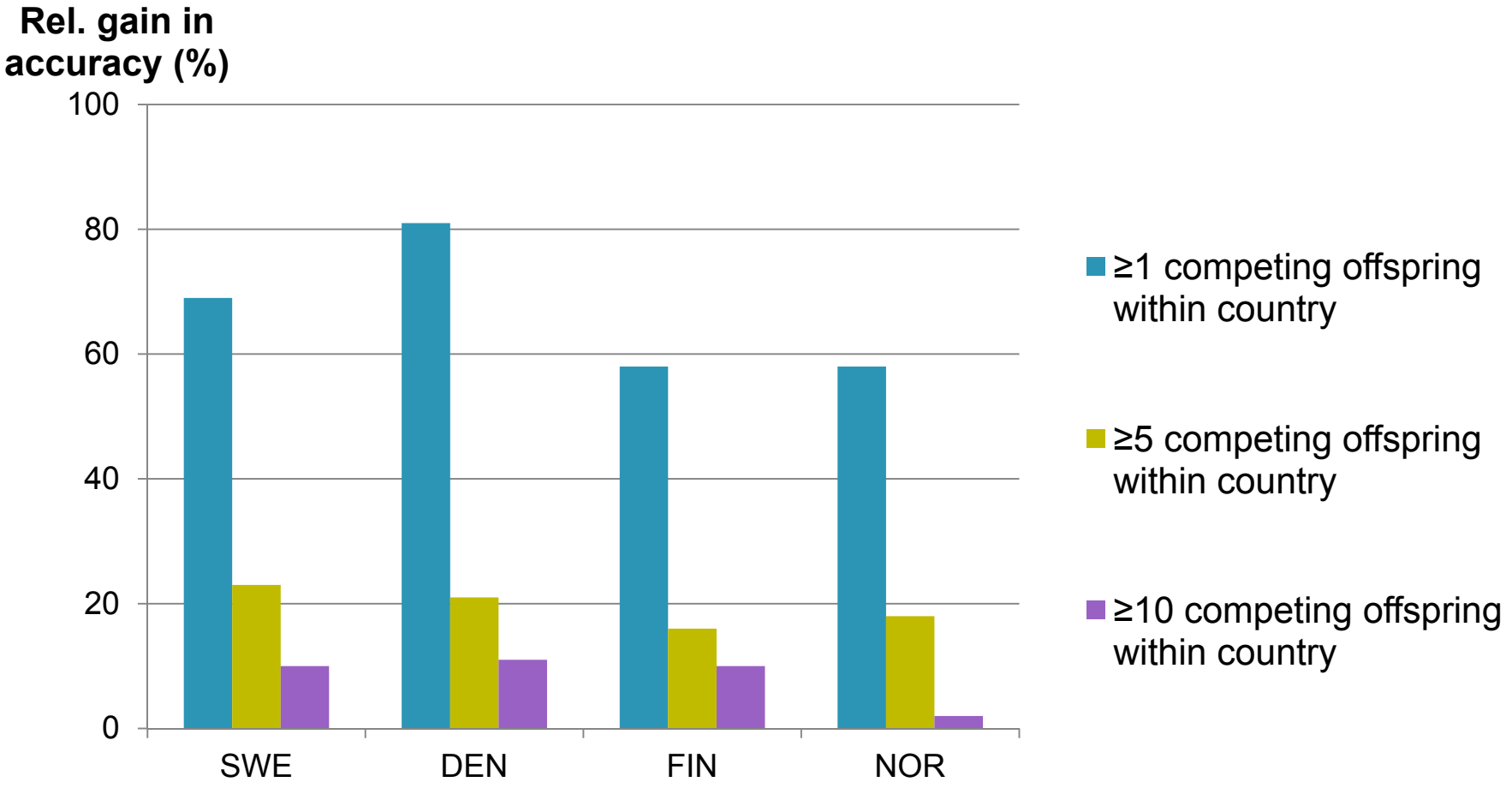

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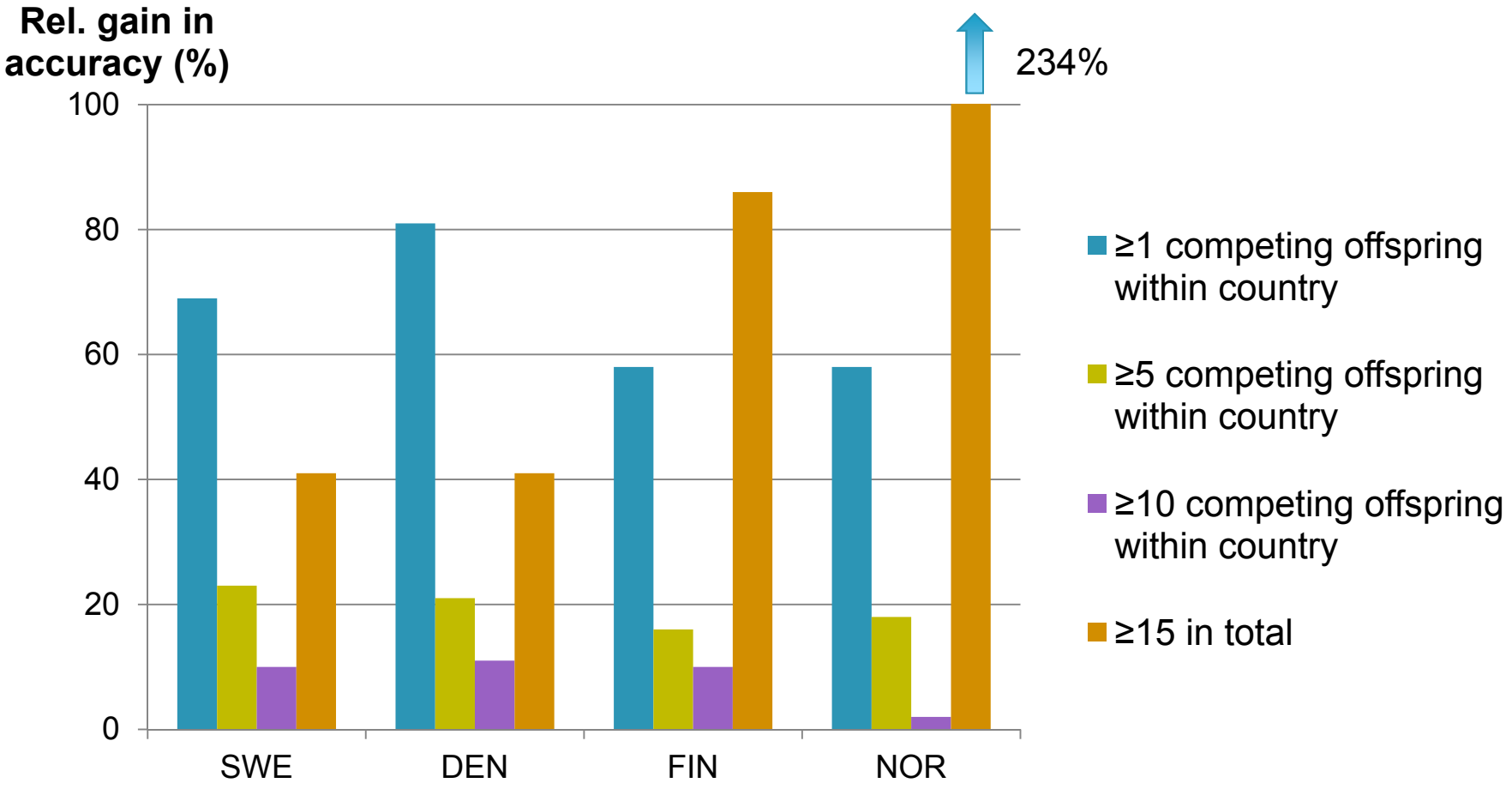
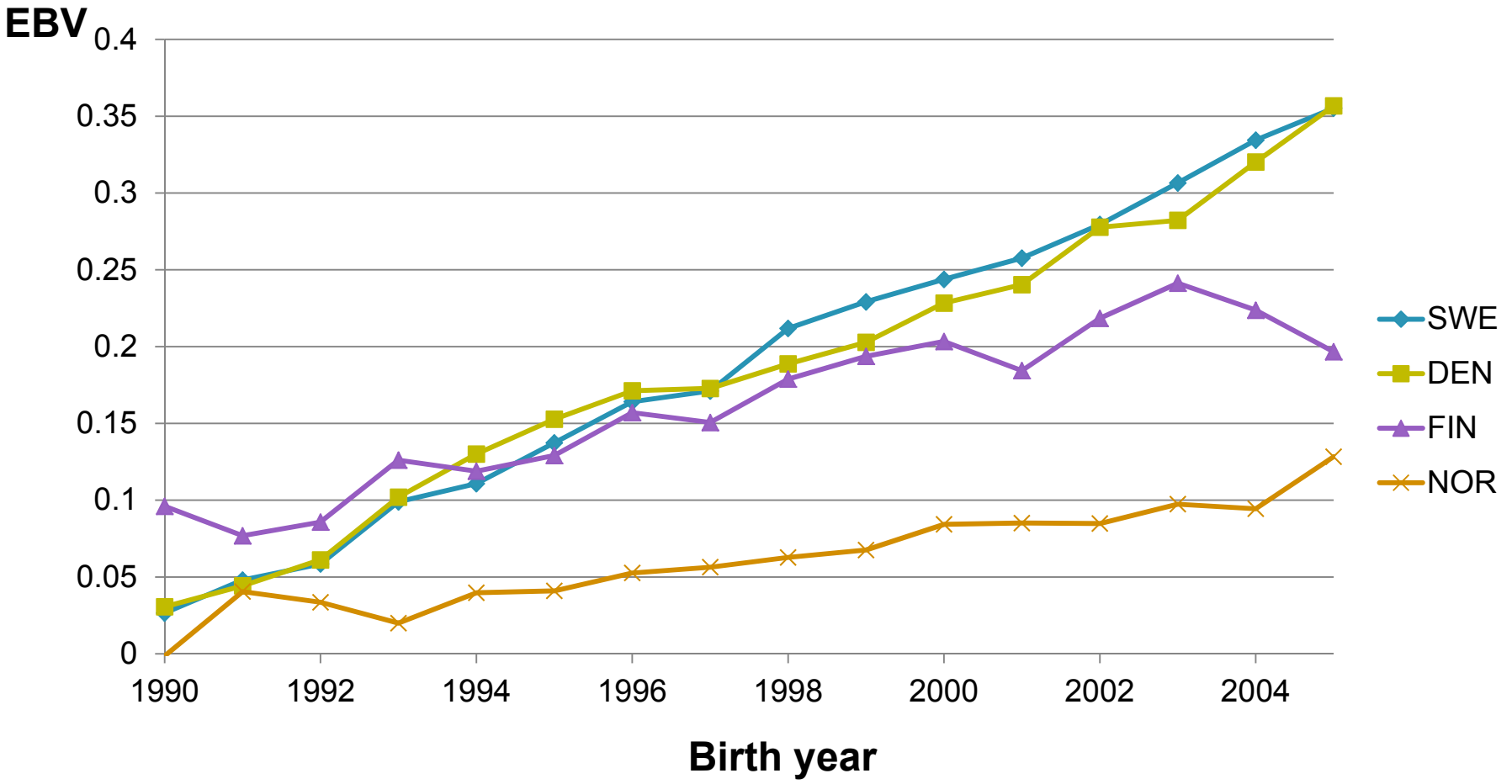
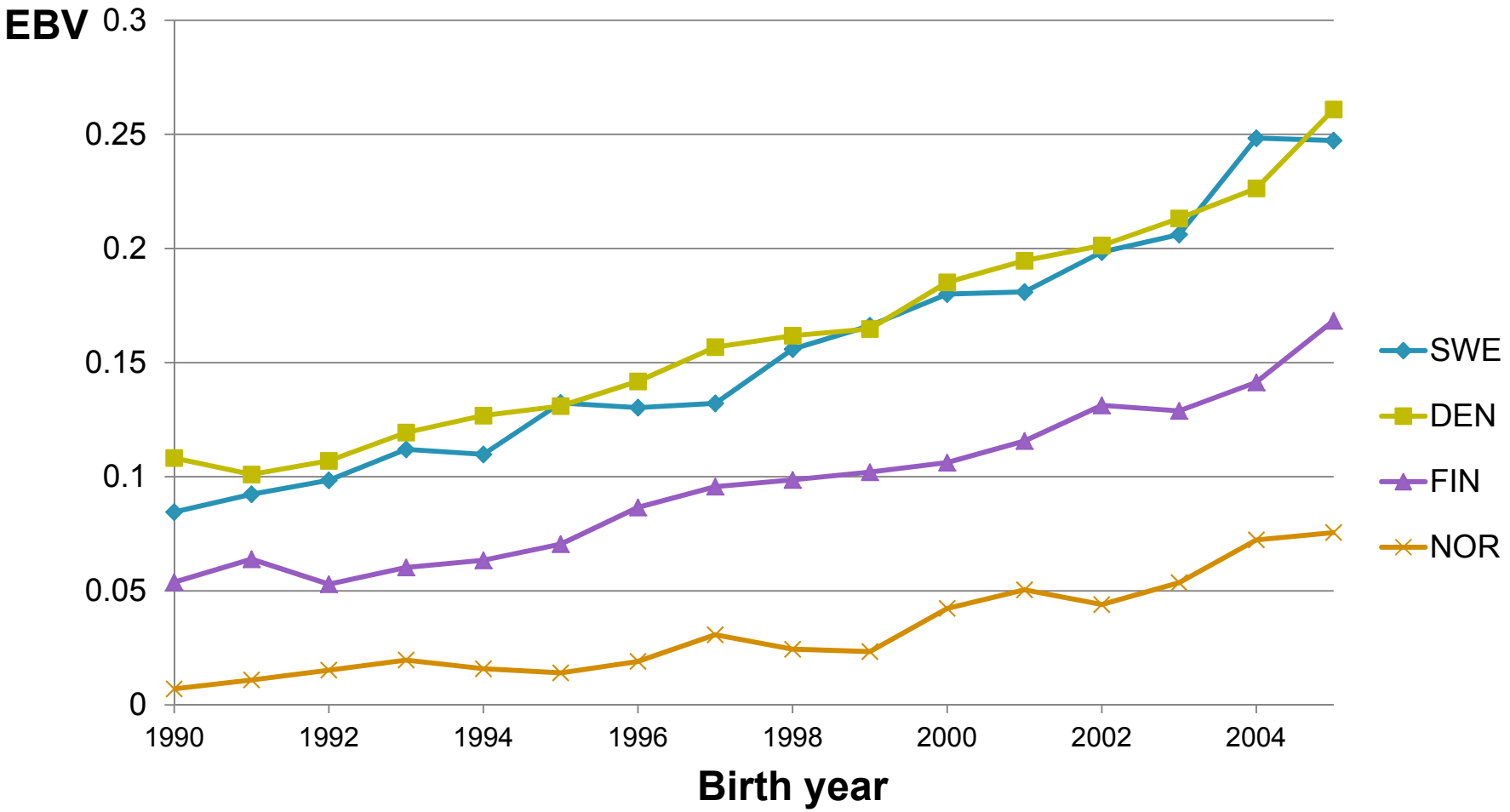


Genetic trends for horses competing in show jumping based on joint Nordic genetic evaluation



Genetic trends for horses competing in dressage based on joint Nordic genetic evaluation



Top stallions WBSFH ranking 2013 - Dressage

Stallion	No of competing offspring in: SWE	DEN	NOR	FIN	TOT
De Niro	50	30	8	12	97
Gribaldi	2	37	3	6	47
Jazz	2	17	1	1	20
Florestan I	10	23	5	12	49
Donnerhall	12	16	0	7	34

Top stallions WBSFH ranking 2013 – Show Jumping

	No of competing offspring in:				
Stallion	SWE	DEN	NOR	FIN	TOT
Baloubet de Rouet	2	14	0	3	17
Kannan	1	3	1	0	5
Quick Star	10	9	0	1	20
Heartbreaker	16	17	2	4	37
Diamant de Semilly	7	5	0	0	12

Conclusions

- Joint Nordic genetic evaluation for competition data is feasible
- More stallions will get earlier and more accurate breeding values
- Additional studies are required
  - how to handle pre-selection for competition

Acknowledgements

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