Genetic parameters for eventing in Irish Sport Horses

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Background

Breeding objective

> "to produce a performance horse that is sound, athletic with good paces and suitable temperament and capable of winning at the highest international level in FEI disciplines"

ISH have topped WBFSH rankings for eventing in 15 out of 17 years

Genetic evaluations have been carried out in Ireland since 1995

- Data was not available for eventing
- Most eventing ISH were over 75% Thoroughbred

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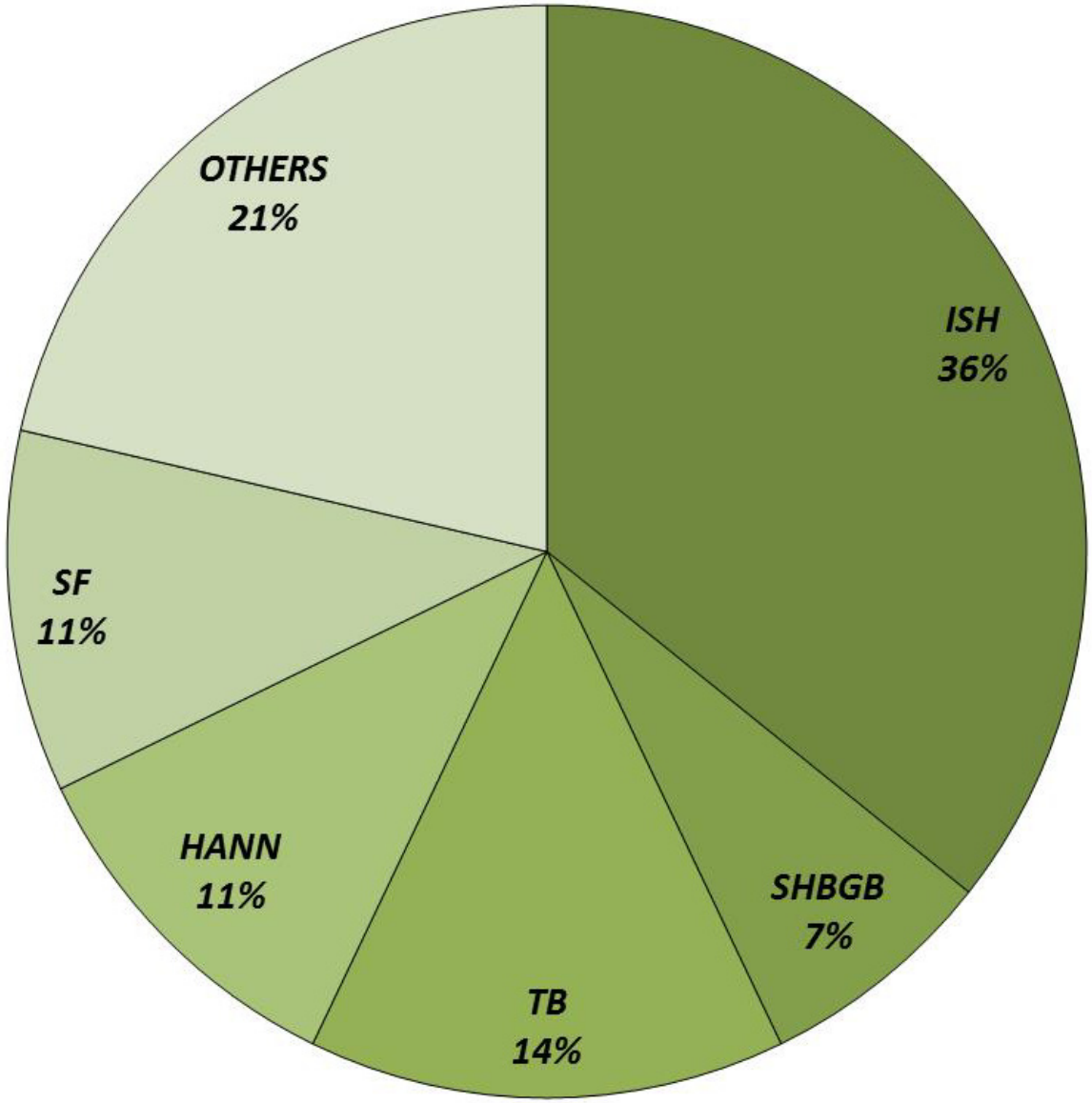
Short-format winners at CCI4* level since 2002



Current WBFSH rankings

	TB%
Ballynoe Castle RM by Ramiro B (BWP)	64%
Electric Cruise by Cruising (ISH)	52%
Fernhill Fearless by Mark Twain (TB)	50%
Kilronan by Ghareeb (TB)	69%
Stellor Rebound by VDL Ricochet (KWPN)	24%
Paulank Brockagh by Touchdown (ISH)	63%

Data collection

Issues with data quality

- Horses frequently change name
- UELN is not always available
- Pedigree is often not recorded
- Studbook may not be recorded

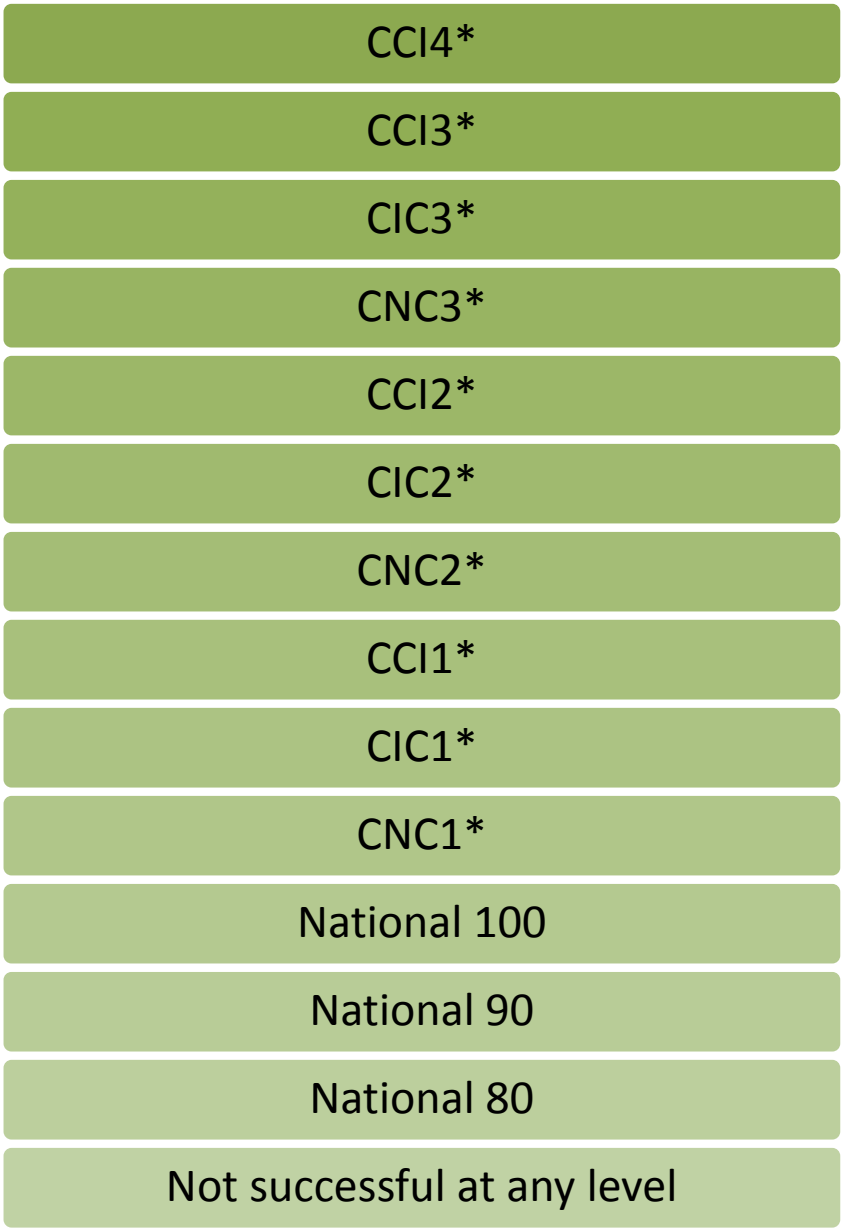
Lifetime Performance Rating

Not always feasible to collate individual performances in each class for each ISH horse

Focus is on assessing the “highest level” successfully achieved by a horse during its lifetime

Success = meeting the FEI Minimum Eligibility Requirement at a level on at least two occassions

Lifetime Performance Rating Levels



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Data used

	No. of records
Number of performances	102,950
Number of horses	2,406
Number of horses in pedigree file	57,136
Number of stallions	624
Number of dams	1,494

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Model used

LPR model

- Fixed effects of sex, year of first performance and Thoroughbred percentage
- Random effect of animal

Heritability of LPR = 0.28

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Model used

Multi-trait model

- Ranking in each phase (dressage, cross country, showjumping and overall result) at each of four levels considered as separate traits (Pre, 1*, 2* and 3*)
- Fixed effects of age, sex, TB% and grade of performance
- Random effects of animal and permanent environment
- Dependent variable - normalised score based on ranks in each phase/competition

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Genetic Parameters

Phase	Dressage		Cross Country		Showjumping		Overall	
Grade	h^2	r_e	h^2	r_e	h^2	r_e	h^2	r_e
Pre	0.14	0.41	0.001	0.12	0.08	0.15	0.06	0.24
CNC*	0.11	0.34	0.02	0.09	0.09	0.14	0.06	0.14
CNC**	0.10	0.37	0.01	0.08	0.01	0.13	0.06	0.16
CNC***	0.22	0.45	0.08	0.08	0.01	0.13	0.06	0.26

Correlations between grades

Phase	Genetic Correlation	Permanent Environmental Correlation
Dressage	0.61 to 0.80	-0.06 to 0.83
Cross Country	0.62 to 0.80	0
Showjumping	0.32 to 0.99	0.28 to 0.68
Overall Competition	0.32 to .97	0.00 to 0.18

Correlations between phases

Phase	Cross Country	Showjumping	Overall
Dressage	0.40 to 0.59	0.41 to 0.62	> 0.90
Cross Country		0.42 to 0.76	0.96 to 0.56
Showjumping			0.60

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Conclusions

Genetic evaluation for eventing is feasible within the Irish Sport Horse Studbook

More data would be beneficial

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