



Breeding for improved hunting performance in Norwegian Elkhound and Swedish Jämthund populations in Finland

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Elkhounds in Finland



- Norwegian and Swedish (gray) elkhounds are among the most popular dog breeds in Finland
 - Elkhound 6th and Jämthund 8th most popular dog breed in 2008
- Most dogs are used actively for hunting
- Elk hunting season lasts from September to December
- During this time, also elk hunting field trials are arranged
 - Aim: to simulate real hunting situation as closely as possible
 - Dogs are evaluated for several aspects of their performance
 - Dogs have at least 4 hours available for search and after finding elk maximum 5 hours of working time
 - Good trial results will earn dog prices (1st, 2nd or 3rd), and sufficient number of 1st prices will give dog a working champion title

Field trial data



- Annually between 4000 and 5000 field trial visits
 - 60 % of participating dogs Elkhounds and 40% Jämthund
- Most dogs go to trials at least 2-3 times in lifetime
 - Record: 73 trials by one dog
- Trial data is used to select best animals for breeding, especially males
- Traditionally data has been further processed into sire averages and similar statistics
- Elkhound club initiative in 2006: BLUP breeding value estimation for elkhound hunting performance?

Aims of this study



1. Estimate genetic parameters of the most important traits evaluated at elk hunting field trials in Finland
2. If sufficient genetic variation is found, develop a routine breeding value estimation procedure for the two elkhound breeds

Data for genetic parameters



- Field trial records from 1991 to 2006:
 - 41 321 trial visits by 6 694 Norwegian Elkhounds
 - 13 731 trial visits by 2 395 Swedish Jämthund
- Registration data up to 2006:
 - 45 286 Norwegian Elkhounds
 - 15 034 Swedish Jämthund

Studied traits



Individual field trials:

- 13 traits that contribute to dog's total merit score
 - Scale 1 to 10
- 5 other traits that contribute to dog's total fault score
 - Scale 0 to 10
- Total score = total merit score – total fault score
- Additionally, a few auxiliary traits that are evaluated but don't contribute directly to total score

Overall trial career:

- Participation in trials (yes/no)
- Age at first trial (months)
- Age at first full working round (months)
- Percent of full working rounds
- Percent of empty trials
- Percent of rewarded trials
- Percent of trials rewarded with 1st price

Models



Individual field trials:

- Sex
- Breed
- Age at trial
- Trial month
- Trial year
- Trial kennel district
- *Animal additive genetic effects*
- *Permanent and random environmental effects*

Overall trial career:

- Sex
- Breed
- Number of participated trials (not for participation)
- *Animal additive genetic effects*
- *Random environmental effects*

Genetic parameters (1)



- Heritability estimates for most individual field trial traits were very low (<0.05)
- Problem: most traits are evaluated subjectively so influence of individual judge is high
 - Highest $h^2 = 0.07$ for search pattern and 0.06 for search speed, bark loudness and following of escaping elk
- Most successful trait: bark density ($h^2 = 0.22$, $r = 0.37$)
 - Note: auxiliary trait that is counted as barks/minute
 - Also evaluated subjectively as a merit score: $h^2 = 0.06$, $r = 0.12$

Genetic parametres (2)



- Career traits average external influences on a dog's trial performance
- Consequently much higher heritability estimates than for traits evaluated at individual field trials:
 - Age at first trial $h^2 = 0.49$, age at first full working round $h^2 = 0.38$
 - Participation in trials and percents of success/failure: h^2 between 0.11 and 0.15
- These traits are also important for a dog's overall success from owner's point of view

Breeding value estimation



- Seven measures selected
 - On basis of heritability estimates
 - And covering the most important aspects of elkhound performance
- Individual field trials:
 - Search spread ($h^2 = 0.06$), bark density ($h^2 = 0.22$), following of escaping elk ($h^2 = 0.06$)
- Overall career:
 - Participation in field trials ($h^2 = 0.11$), age at first full working round ($h^2 = 0.38$), percent of empty trials ($h^2 = 0.12$), percent of trials rewarded with 1st price ($h^2 = 0.15$)

EBV estimation



- Annually since 2007 using BLUP methodology and univariate models
- Both breeds estimated jointly
- Cumulated data from 1991 onwards
 - Possibly need to start culling oldest records at some point
- Total merit index:
 - 50% weight on participation in trials, 20% on age at first full working round, 6% each for other traits
- EBVs are published by the breed club and available at their website
- Good reception from breed enthusiasts

Thank you for your attention!



(all photos from www.shhj.info)