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|--|--|
| COUNTRY'S NAME | ESTONIA |
| Production traits | Milk, fat, protein |
| Breed | Estonian Holstein Estonian Red |
| Trait definition and unit of measurement | Milk(kg), fat(kg), protein(kg), fat(%), protein(%), all traits collected by official milk recording organizations according to ICAR rules. EBV-s are average 305-d milk, fat and protein yields(kg) across lactations 1, 2 and 3 with equal weights (1/3). Percentages are calculated indirectly from yield EBV-s. |
| Criteria for inclusion & extension of records | All valid test day records between 5 and 365 days in milk for animals with a known sire registration number, having at least 3 first test day records |
| Time period for data inclusion | Cows which first calved since October 1, 1994 plus all known pedigree information |
| Sire categories | All sires |
| Number of lactations included in the evaluation | Valid test day records for lactations 1, 2 and 3 with equal weights for lactation |
| Environmental effects: Pre-adjustment | No pre-adjustments |
| Base for age pre-adjustment | |
| Method (model) of genetic evaluation | ST – ML – FR – TD – BLUP – AM (fixed lactation curves) |
| Environmental effects in the genetic evaluation model | Fixed: Herd test day effect within 1 st lactation, 2 nd and 3 rd lactation combined, Fixed lactation curves defined by lactation * calving age * calving season * calving interval (total 210 different curves) Random: Permanent environmental effects within each lactation, animal |
| Use of genetic groups | Fixed genetic groups are defined representing all unknown parents of animals according to sex and year of birth |
| Genetic parameters in the evaluation | See Appendix I |
| System validation | Yield and pedigree data checking before every evaluation run |
| Expression of genetic evaluations | EBV(milk kg, fat kg, protein kg, fat %, protein %) |
| Genetic (reference) base | EBV: within each breed all cows born 1995 RBV: within each breed all AI bulls born 1990-1992 (yearly rolling base) |
| Next base change | EBV: February 2005 -> all cows born 2000 RBV: February 2001 -> all AI bulls born 1991-1993 |
| Criteria for official publication of evaluations | At least 20 daughters in at least 3 herds |
| Number of evaluations / publications per year | 4: February, May, August, November |
| Use in production / total merit index | Estonian Holstein: Milk-index (SPAV) = RBV (100/12) rel. weights (fat kg : protein kg) = 1 : 4 Estonian Red: Milk-index (SPAV) = RBV (100/12) rel. weights (RBV _{milk} : RBV _{fat} : RBV _{protein}) = -0.1 : 1 : 6 |
| Anticipated changes in the near future | None |
| Key reference on methodology applied | Reents et al., 1995a: J. Dairy Sci. 78: 2847 Reents et al., 1995b: J. Dairy Sci. 78: 2858 |
| Key organization: name, address, phone, fax, e-mail, web site | Estonian Agricultural Registers and Information Centre 48A Kreutzwaldi Str. Tartu 50094 Estonia Phone: +372 7 387 731 Fax: +372 7 387 702 e-mail: mart@reg.agri.ee web site: http://www.reg.agri.ee |

Appendix I

Genetic parameters for milk, fat and protein yield (test day records), repeatability (t), σ_p^2 , heritabilities (on diagonals), genetic correlations (above diagonal) and phenotypic correlations (below diagonal)

| Trait | Lactation | t | σ_p^2 | 1 | 2 | 3 |
|-----------------------|-----------|-----|--------------|--------------|--------------|--------------|
| Milk yield (kg) | 1 | 0.5 | 17.66 | 0.295 | 0.924 | 0.878 |
| | 2 | 0.5 | 32.66 | 0.44 | 0.242 | 0.961 |
| | 3 | 0.5 | 36.86 | 0.36 | 0.43 | 0.228 |
| Fat yield (kg) | 1 | 0.5 | 0.026 | 0.254 | 0.922 | 0.921 |
| | 2 | 0.5 | 0.052 | 0.39 | 0.202 | 0.987 |
| | 3 | 0.5 | 0.060 | 0.33 | 0.39 | 0.179 |
| Protein yield (kg) | 1 | 0.5 | 0.016 | 0.248 | 0.915 | 0.862 |
| | 2 | 0.5 | 0.029 | 0.41 | 0.229 | 0.945 |
| | 3 | 0.5 | 0.033 | 0.33 | 0.42 | 0.202 |

Permanent environmental correlations(below diagonal)

| Trait | Lactation | 1 | 2 | 3 |
|-----------------------|-----------|-------|-------|---|
| Milk yield (kg) | 1 | | | |
| | 2 | 0.500 | | |
| | 3 | 0.347 | 0.503 | |
| Fat yield (kg) | 1 | | | |
| | 2 | 0.546 | | |
| | 3 | 0.410 | 0.582 | |
| Protein yield (kg) | 1 | | | |
| | 2 | 0.527 | | |
| | 3 | 0.381 | 0.564 | |

| COUNTRY: Estonia | | | | | | | | | | | |
|--|-----|------|-----|------|------|---------|------|-------|------|-----------|------|
| Number of AI bulls (NB) tested, means (X), and standard deviations (SD) of proofs (kg, %) from most recent run, by bulls' year of birth (YB) and breed (The average proofs are calculated from all bulls). | | | | | | | | | | | |
| YB | NB | Milk | | Fat | | Protein | | Fat % | | Protein % | |
| | | X | SD | X | SD | X | SD | X | SD | X | SD |
| Breed Estonian Holstein | | | | | | | | | | | |
| 1987 | 163 | 25 | 357 | -0.3 | 14.1 | -0.9 | 9.9 | -0.02 | 0.19 | -0.03 | 0.07 |
| 1988 | 164 | 121 | 427 | 2.2 | 15.5 | 1.7 | 11.8 | -0.05 | 0.20 | -0.04 | 0.09 |
| 1989 | 134 | 352 | 459 | 7.8 | 16.9 | 6.1 | 13.2 | -0.12 | 0.20 | -0.08 | 0.09 |
| 1990 | 115 | 126 | 533 | 4.9 | 17.0 | 3.1 | 13.6 | 0.01 | 0.26 | -0.01 | 0.11 |
| 1991 | 76 | 32 | 514 | 2.3 | 15.1 | 2.4 | 13.3 | 0.03 | 0.24 | 0.03 | 0.09 |
| 1992 | 92 | -6 | 530 | -3.1 | 15.6 | -0.6 | 12.2 | -0.04 | 0.27 | 0.00 | 0.12 |
| 1993 | 68 | 440 | 678 | 10.0 | 20.6 | 8.3 | 15.7 | -0.13 | 0.32 | -0.08 | 0.13 |
| 1994 | 84 | 261 | 504 | 8.4 | 16.5 | 6.9 | 13.7 | -0.03 | 0.24 | -0.02 | 0.11 |
| 1995 | 59 | 370 | 642 | 8.9 | 21.8 | 9.3 | 16.7 | -0.10 | 0.26 | -0.03 | 0.12 |
| Breed Estonian Red | | | | | | | | | | | |
| 1987 | 89 | 159 | 420 | 2.5 | 15.5 | 2.4 | 10.7 | -0.09 | 0.23 | -0.05 | 0.15 |
| 1988 | 79 | 127 | 328 | 0.3 | 11.3 | 1.0 | 8.1 | -0.12 | 0.21 | -0.07 | 0.09 |
| 1989 | 68 | 197 | 358 | 5.9 | 15.3 | 4.3 | 8.5 | -0.06 | 0.20 | -0.04 | 0.11 |
| 1990 | 57 | 131 | 324 | 3.2 | 15.2 | 2.0 | 7.9 | -0.06 | 0.19 | -0.05 | 0.12 |
| 1991 | 37 | 165 | 322 | 1.1 | 11.5 | 4.4 | 8.9 | -0.13 | 0.20 | -0.02 | 0.07 |
| 1992 | 42 | 122 | 403 | 0 | 13.4 | 2.0 | 9.4 | -0.11 | 0.27 | -0.03 | 0.13 |
| 1993 | 18 | 136 | 442 | 2.4 | 17.8 | 1.2 | 9.3 | -0.07 | 0.23 | -0.06 | 0.15 |
| 1994 | 18 | 8 | 340 | -3.7 | 21.4 | -0.1 | 10.0 | -0.10 | 0.29 | -0.01 | 0.09 |
| 1995 | 14 | 64 | 265 | 2.1 | 10.5 | 0.3 | 6.4 | -0.01 | 0.18 | -0.04 | 0.11 |

| COUNTRY: Estonia | | | | | | | | | | | |
|---|-------|------|-----|------|------|---------|-----|-------|------|-----------|------|
| Average (X) and standard deviations (SD) of breeding values (kg) included in the most recent evaluation run, by daughters' year of calving (YC), number of cows (NC) and breed. | | | | | | | | | | | |
| YC | NC | Milk | | Fat | | Protein | | Fat % | | Protein % | |
| | | X | SD | X | SD | X | SD | X | SD | X | SD |
| Breed Estonian Holstein | | | | | | | | | | | |
| 1994 | 1922 | 65 | 366 | 0.2 | 14.9 | 0.5 | 8.8 | -0.04 | 0.24 | -0.02 | 0.11 |
| 1995 | 12507 | 7 | 307 | -1.8 | 12.5 | -0.4 | 7.5 | -0.03 | 0.20 | -0.01 | 0.09 |
| 1996 | 14972 | -35 | 285 | -0.5 | 12.2 | -0.3 | 7.5 | 0.02 | 0.20 | 0.02 | 0.08 |
| 1997 | 16430 | -10 | 317 | 0.5 | 12.8 | -0.3 | 7.5 | 0.02 | 0.20 | 0.01 | 0.08 |
| 1998 | 17074 | 33 | 355 | 2.3 | 14.0 | 0.9 | 8.7 | 0.02 | 0.21 | 0.00 | 0.09 |
| 1999 | 16207 | 60 | 371 | 4.8 | 14.1 | 2.0 | 8.6 | 0.05 | 0.23 | 0.01 | 0.10 |
| 2000 | 7871 | 139 | 394 | 7.2 | 15.5 | 4.3 | 9.5 | 0.03 | 0.27 | 0.00 | 0.11 |
| Breed Estonian Red | | | | | | | | | | | |
| 1994 | 1057 | 79 | 314 | 3.3 | 12.3 | 1.2 | 7.6 | 0.00 | 0.21 | -0.03 | 0.11 |
| 1995 | 7054 | 48 | 297 | 0.6 | 11.9 | 0.2 | 7.5 | -0.03 | 0.19 | -0.03 | 0.09 |
| 1996 | 8133 | -18 | 269 | -1.7 | 11.0 | -0.9 | 7.0 | -0.02 | 0.20 | -0.01 | 0.08 |
| 1997 | 7812 | -14 | 272 | -0.8 | 11.2 | -0.5 | 7.2 | 0.00 | 0.21 | 0.00 | 0.08 |
| 1998 | 8240 | 28 | 296 | 1.1 | 11.7 | 0.8 | 8.0 | 0.00 | 0.20 | 0.00 | 0.09 |
| 1999 | 6975 | 78 | 376 | 2.5 | 13.8 | 1.9 | 9.7 | -0.01 | 0.21 | -0.01 | 0.11 |
| 2000 | 3943 | 142 | 395 | 4.2 | 15.5 | 2.9 | 9.8 | -0.04 | 0.23 | -0.03 | 0.12 |

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|---|-------|------|-----|------|------|---------|------|-------|------|-----------|------|
| Average (X) and standard deviations (SD) of breeding values (kg) included in the most recent evaluation run, by daughters' year of birth (YB), number of cows (NC) and breed. | | | | | | | | | | | |
| YB | NC | Milk | | Fat | | Protein | | Fat % | | Protein % | |
| | | X | SD | X | SD | X | SD | X | SD | X | SD |
| Breed Estonian Holstein | | | | | | | | | | | |
| 1992 | 10383 | 41 | 308 | -0.9 | 12.7 | -0.1 | 7.6 | -0.05 | 0.19 | -0.02 | 0.09 |
| 1993 | 13554 | -47 | 288 | -2.3 | 12.3 | -0.9 | 7.4 | 0 | 0.19 | 0.01 | 0.09 |
| 1994 | 14308 | -40 | 293 | 0.9 | 12.3 | -0.1 | 7.7 | 0.05 | 0.20 | 0.02 | 0.08 |
| 1995 | 15677 | 0 | 338 | 0 | 13.2 | 0 | 8.5 | 0.01 | 0.20 | 0 | 0.09 |
| 1996 | 16009 | 47 | 361 | 3.8 | 14.0 | 1.5 | 8.7 | 0.04 | 0.23 | 0.01 | 0.10 |
| 1997 | 14174 | 104 | 378 | 6.6 | 14.7 | 3.2 | 8.8 | 0.05 | 0.25 | 0.01 | 0.11 |
| 1998 | 2878 | 244 | 413 | 8.4 | 15.4 | 6.2 | 10.4 | -0.02 | 0.28 | -0.02 | 0.10 |
| Breed Estonian Red | | | | | | | | | | | |
| 1992 | 6120 | 64 | 300 | 1.8 | 12.0 | 0.6 | 7.4 | -0.02 | 0.19 | -0.03 | 0.09 |
| 1993 | 7142 | -17 | 277 | -2.4 | 11.3 | -1.2 | 7.2 | -0.03 | 0.20 | -0.01 | 0.08 |
| 1994 | 7331 | -31 | 266 | -1.3 | 10.9 | -1.1 | 7.0 | 0.01 | 0.21 | 0.00 | 0.08 |
| 1995 | 7606 | 0 | 276 | 0 | 11.2 | 0 | 7.3 | 0.01 | 0.21 | 0 | 0.08 |
| 1996 | 7816 | 49 | 317 | 2.1 | 12.1 | 1.4 | 8.5 | 0.01 | 0.20 | 0.00 | 0.09 |
| 1997 | 5767 | 134 | 412 | 4.0 | 15.3 | 3.0 | 10.4 | -0.03 | 0.23 | -0.02 | 0.12 |
| 1998 | 1432 | 210 | 362 | 4.9 | 14.9 | 3.6 | 8.9 | -0.09 | 0.21 | -0.07 | 0.11 |

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| YC | NC | Milk | | Fat | | Protein | | Fat % | | Protein % | |
| | | X | SD | X | SD | X | SD | X | SD | X | SD |
| Breed Estonian Holstein | | | | | | | | | | | |
| 1994 | 1922 | 65 | 366 | 0.2 | 14.9 | 0.5 | 8.8 | -0.04 | 0.24 | -0.02 | 0.11 |
| 1995 | 12507 | 7 | 307 | -1.8 | 12.5 | -0.4 | 7.5 | -0.03 | 0.20 | -0.01 | 0.09 |
| 1996 | 14972 | -35 | 285 | -0.5 | 12.2 | -0.3 | 7.5 | 0.02 | 0.20 | 0.02 | 0.08 |
| 1997 | 16430 | -10 | 317 | 0.5 | 12.8 | -0.3 | 7.5 | 0.02 | 0.20 | 0.01 | 0.08 |
| 1998 | 17074 | 33 | 355 | 2.3 | 14.0 | 0.9 | 8.7 | 0.02 | 0.21 | 0.00 | 0.09 |
| 1999 | 16207 | 60 | 371 | 4.8 | 14.1 | 2.0 | 8.6 | 0.05 | 0.23 | 0.01 | 0.10 |
| 2000 | 7871 | 139 | 394 | 7.2 | 15.5 | 4.3 | 9.5 | 0.03 | 0.27 | 0.00 | 0.11 |
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| 1994 | 1057 | 79 | 314 | 3.3 | 12.3 | 1.2 | 7.6 | 0.00 | 0.21 | -0.03 | 0.11 |
| 1995 | 7054 | 48 | 297 | 0.6 | 11.9 | 0.2 | 7.5 | -0.03 | 0.19 | -0.03 | 0.09 |
| 1996 | 8133 | -18 | 269 | -1.7 | 11.0 | -0.9 | 7.0 | -0.02 | 0.20 | -0.01 | 0.08 |
| 1997 | 7812 | -14 | 272 | -0.8 | 11.2 | -0.5 | 7.2 | 0.00 | 0.21 | 0.00 | 0.08 |
| 1998 | 8240 | 28 | 296 | 1.1 | 11.7 | 0.8 | 8.0 | 0.00 | 0.20 | 0.00 | 0.09 |
| 1999 | 6975 | 78 | 376 | 2.5 | 13.8 | 1.9 | 9.7 | -0.01 | 0.21 | -0.01 | 0.11 |
| 2000 | 3943 | 142 | 395 | 4.2 | 15.5 | 2.9 | 9.8 | -0.04 | 0.23 | -0.03 | 0.12 |