Table S1: Estimated variance components for different heat tolerance traits and their genetic variation compared to population-wise effects, when requiring at high number of records per cows to call a pheno. \*The genetic variation is expressed as the genetic standard deviation multiplied by 20 to express the differences between a ”standard” cow and 1 gSD superior cow in THI = 50 and THI = 70 conditions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Trait | Heritability (SE) when requiring 10 records | Heritability (SE) when requiring 10 records) | Heritability (SE) when requiring 10 records | Estimated genetic variation\* when requiring 10 records | Estimated genetic variation\* when requiring 15 records | Estimated genetic variation\* when requiring 20 records |
| F% | 0.064 (0.008) | 0.071 (0.009) | 0.092 (0.015) | 0.087 | 0.083 | 0.083 |
| P% | 0.123 (0.01) | 0.128 (0.012) | 0.143 (0.018) | 0.054 | 0.051 | 0.049 |
| lact | 0.048 (0.007) | 0.031 (0.006) | 0.024 (0.008) | 0.02 | 0.014 | 0.011 |
| C-4:0 | 0.058 (0.008) | 0.045 (0.008) | 0.073 (0.013) | 0.346 | 0.273 | 0.301 |
| C-6:0 | 0.068 (0.008) | 0.066 (0.009) | 0.088 (0.014) | 0.043 | 0.038 | 0.039 |
| C-8:0 | 0.131 (0.01) | 0.151 (0.012) | 0.204 (0.019) | 0.042 | 0.041 | 0.043 |
| C-10:0 | 0.129 (0.01) | 0.146 (0.012) | 0.199 (0.019) | 0.037 | 0.036 | 0.038 |
| C-12:0 | 0.095 (0.009) | 0.104 (0.011) | 0.139 (0.017) | 0.096 | 0.091 | 0.093 |
| C-14:0 | 0.073 (0.008) | 0.082 (0.01) | 0.097 (0.015) | 0.113 | 0.108 | 0.103 |
| C-16:0 | 0.063 (0.008) | 0.06 (0.009) | 0.068 (0.012) | 0.162 | 0.141 | 0.129 |
| C-18:0 | 0.119 (0.01) | 0.13 (0.012) | 0.14 (0.017) | 0.569 | 0.541 | 0.494 |
| C-18:1 cis9 | 0.144 (0.01) | 0.157 (0.012) | 0.201 (0.019) | 0.305 | 0.288 | 0.284 |
| C-18:1 cis11 | 0.058 (0.008) | 0.048 (0.008) | 0.028 (0.008) | 0.343 | 0.28 | 0.183 |
| C-18:2 cis9,12 | 0.077 (0.008) | 0.061 (0.008) | 0.067 (0.012) | 0.014 | 0.011 | 0.01 |
| C-18:3 cis 9,12,15 | 0.055 (0.007) | 0.054 (0.008) | 0.044 (0.011) | 0.031 | 0.027 | 0.021 |
| CLA cis 9, trans 11 | 0.144 (0.01) | 0.156 (0.012) | 0.158 (0.017) | 0.021 | 0.02 | 0.017 |