SEGES INNOVATION

STØTTET AF Mælkeafgiftsfonden

## Mendelian sampling for singlestep

Mendelian sampling er defineret som ms= egen_ss – (½dam_ss+½sire_ss)
Det vil sige at mendelian sampling er positiv for dyr hvor egen index er større end parent avarage

BYR = birth year
n= antal dyr bag gennemsnit
ss= singlestep breeding value for dyret
ms=mendelian sampling for dyret
pa=parent avarage for dyret
corr_ms_ss = correlation mellem mendelian sampling for dyret og dyrets index
corr_ms_pa = correlation mellem mendelian sampling for dyret og dyrets paranet avarage
corr_ms_dam = correlation mellem mendelian sampling for dyret og dyrets mors index
corr_ms_sire = correlation mellem mendelian sampling for dyret og dyrets fars index

Jeg har i første omgang set på hundyr uden fænotype, med genotype, og opdelt efter om moren er genotypet eller ej. I singlestep inkluderes kun genotyper for dyr født >= 2009.

Resultater er vist for fertility egenskaber icf og ifl for combined 1.-3. laktation og for det combined fert index. Derudover også vist for combined claw (klovsundhed) og for combined GH (generel sundhed)

Generelt for alle egenskaberne og alle racerne gælder at mendelian sampling er større for hundyr hvor moren ikke er genotypet end når moren er genotypet. Generelt gælder at mendelian sampling korrelerer nul til farens index og korrelerer nul til morens index, når moren er genotypet. Når moren IKKE er genotypet, er der en positiv korrelation mellem mendelian sampling og morens index. Det vil sige at når moren ikke er genotypet vil der være tendens til at højere avlsværdi for moren betyder højere afvigelse i positiv retning for datteren, altså at datterens index er større end parent avarage når moren ikke genotypet og at det forøges ved stigende index for moren.

## JER 'icf ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 98 | -0.86 | 96 | 99 | 94 | 0.67 | -0.01 | 0.04 | -0.05 |
| 2 | 2013 | 227 | 0.52 | 97 | 98 | 95 | 0.68 | 0.05 | 0.01 | 0.05 |
| 3 | 2014 | 403 | 0.03 | 97 | 98 | 96 | 0.65 | 0.05 | -0.07 | 0.13 |
| 4 | 2015 | 672 | -0.20 | 97 | 98 | 97 | 0.65 | -0.05 | -0.02 | -0.05 |
| 5 | 2016 | 973 | -0.22 | 98 | 98 | 99 | 0.64 | 0.03 | 0.00 | 0.03 |
| 6 | 2017 | 1130 | 0.14 | 99 | 98 | 100 | 0.65 | -0.01 | 0.00 | -0.02 |
| 7 | 2018 | 1440 | 0.21 | 100 | 98 | 102 | 0.67 | -0.01 | -0.04 | 0.02 |
| 8 | 2019 | 2115 | 0.04 | 98 | 99 | 97 | 0.60 | -0.03 | -0.01 | -0.04 |
| 9 | 2020 | 2842 | 0.25 | 101 | 100 | 101 | 0.62 | 0.02 | 0.03 | 0.00 |
| 10 | 2021 | 1465 | 0.33 | 102 | 100 | 103 | 0.67 | 0.03 | 0.00 | 0.04 |
| 11 | 2022 | 2899 | 0.23 | 102 | 101 | 103 | 0.60 | 0.01 | 0.00 | 0.01 |
| 12 | 2023 | 10185 | 0.06 | 102 | 101 | 103 | 0.66 | 0.00 | 0.01 | 0.00 |
| 13 | 2024 | 691 | -0.07 | 103 | 102 | 104 | 0.73 | -0.04 | -0.03 | -0.03 |

## JER 'icf ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 357 | -0.25 | 97 | 98 | 97 | 0.69 | 0.19 | 0.24 | 0.07 |
| 2 | 2013 | 361 | -0.14 | 97 | 97 | 96 | 0.74 | 0.22 | 0.31 | 0.04 |
| 3 | 2014 | 517 | -0.23 | 97 | 98 | 96 | 0.68 | 0.17 | 0.33 | -0.03 |
| 4 | 2015 | 1108 | 0.29 | 98 | 99 | 96 | 0.74 | 0.23 | 0.33 | 0.02 |
| 5 | 2016 | 1528 | 0.21 | 99 | 99 | 99 | 0.69 | 0.19 | 0.34 | 0.00 |
| 6 | 2017 | 1587 | 0.23 | 99 | 99 | 99 | 0.73 | 0.22 | 0.33 | 0.03 |
| 7 | 2018 | 1662 | 0.31 | 100 | 99 | 101 | 0.71 | 0.16 | 0.29 | -0.03 |
| 8 | 2019 | 1886 | 0.35 | 99 | 99 | 97 | 0.71 | 0.18 | 0.29 | 0.00 |
| 9 | 2020 | 1832 | 0.02 | 100 | 100 | 100 | 0.66 | 0.17 | 0.29 | 0.02 |
| 10 | 2021 | 431 | 0.63 | 103 | 100 | 104 | 0.71 | 0.16 | 0.23 | 0.04 |
| 11 | 2022 | 861 | 0.58 | 102 | 100 | 103 | 0.66 | 0.17 | 0.25 | 0.04 |
| 12 | 2023 | 2960 | 0.49 | 103 | 101 | 104 | 0.74 | 0.22 | 0.35 | 0.01 |
| 13 | 2024 | 226 | 0.28 | 104 | 102 | 105 | 0.83 | 0.25 | 0.28 | 0.01 |

## JER 'ifl ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 98 | -0.80 | 94 | 96 | 94 | 0.68 | -0.07 | -0.01 | -0.07 |
| 2 | 2013 | 227 | 0.64 | 96 | 95 | 96 | 0.69 | -0.09 | -0.10 | -0.03 |
| 3 | 2014 | 403 | 0.03 | 96 | 95 | 97 | 0.67 | 0.02 | -0.04 | 0.07 |
| 4 | 2015 | 672 | 0.23 | 97 | 97 | 97 | 0.65 | -0.04 | 0.00 | -0.05 |
| 5 | 2016 | 973 | 0.00 | 97 | 98 | 96 | 0.63 | 0.02 | 0.01 | 0.03 |
| 6 | 2017 | 1130 | 0.35 | 99 | 97 | 100 | 0.63 | 0.01 | -0.02 | 0.03 |
| 7 | 2018 | 1440 | 0.23 | 100 | 98 | 103 | 0.64 | -0.05 | -0.05 | -0.01 |
| 8 | 2019 | 2115 | 0.00 | 99 | 99 | 99 | 0.56 | -0.02 | 0.01 | -0.04 |
| 9 | 2020 | 2842 | 0.45 | 101 | 100 | 100 | 0.57 | -0.02 | 0.00 | -0.03 |
| 10 | 2021 | 1465 | 0.48 | 104 | 101 | 107 | 0.62 | 0.01 | 0.00 | 0.01 |
| 11 | 2022 | 2899 | 0.05 | 104 | 102 | 106 | 0.63 | 0.00 | 0.02 | -0.02 |
| 12 | 2023 | 10185 | 0.03 | 105 | 104 | 106 | 0.66 | -0.02 | -0.02 | -0.01 |
| 13 | 2024 | 691 | -0.12 | 105 | 105 | 106 | 0.73 | -0.06 | -0.03 | -0.05 |

## JER 'ifl ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 357 | -0.64 | 94 | 94 | 95 | 0.73 | 0.24 | 0.33 | 0.05 |
| 2 | 2013 | 361 | -0.52 | 94 | 94 | 96 | 0.77 | 0.26 | 0.34 | 0.04 |
| 3 | 2014 | 517 | -0.35 | 96 | 95 | 98 | 0.69 | 0.14 | 0.36 | -0.08 |
| 4 | 2015 | 1108 | 0.47 | 97 | 97 | 97 | 0.73 | 0.22 | 0.39 | 0.00 |
| 5 | 2016 | 1528 | 0.43 | 98 | 98 | 97 | 0.71 | 0.21 | 0.36 | 0.00 |
| 6 | 2017 | 1587 | 0.52 | 99 | 98 | 99 | 0.71 | 0.23 | 0.35 | 0.05 |
| 7 | 2018 | 1662 | 0.50 | 101 | 98 | 102 | 0.72 | 0.16 | 0.28 | -0.02 |
| 8 | 2019 | 1886 | 0.53 | 99 | 99 | 98 | 0.67 | 0.19 | 0.27 | 0.06 |
| 9 | 2020 | 1832 | 0.49 | 101 | 100 | 100 | 0.65 | 0.16 | 0.29 | 0.02 |
| 10 | 2021 | 431 | 0.48 | 105 | 100 | 108 | 0.74 | 0.22 | 0.32 | 0.02 |
| 11 | 2022 | 861 | 0.54 | 104 | 101 | 105 | 0.69 | 0.16 | 0.27 | 0.00 |
| 12 | 2023 | 2960 | 0.69 | 106 | 103 | 106 | 0.75 | 0.21 | 0.32 | 0.00 |
| 13 | 2024 | 226 | 0.57 | 105 | 105 | 105 | 0.79 | 0.19 | 0.27 | -0.04 |

### JER 'fert' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 98 | -0.81 | 94 | 96 | 93 | 0.68 | -0.08 | -0.02 | -0.08 |
| 2 | 2013 | 227 | 0.58 | 95 | 94 | 95 | 0.68 | -0.08 | -0.08 | -0.02 |
| 3 | 2014 | 403 | 0.05 | 96 | 95 | 97 | 0.68 | 0.04 | -0.04 | 0.08 |
| 4 | 2015 | 672 | 0.22 | 97 | 96 | 97 | 0.65 | -0.03 | -0.01 | -0.03 |
| 5 | 2016 | 973 | 0.00 | 96 | 97 | 96 | 0.63 | 0.03 | 0.01 | 0.03 |
| 6 | 2017 | 1130 | 0.33 | 99 | 97 | 100 | 0.62 | 0.01 | -0.01 | 0.03 |
| 7 | 2018 | 1440 | 0.22 | 100 | 97 | 103 | 0.64 | -0.03 | -0.04 | 0.00 |
| 8 | 2019 | 2115 | -0.04 | 99 | 99 | 99 | 0.56 | -0.02 | 0.01 | -0.03 |
| 9 | 2020 | 2842 | 0.45 | 100 | 100 | 100 | 0.58 | -0.01 | 0.01 | -0.02 |
| 10 | 2021 | 1465 | 0.47 | 105 | 101 | 108 | 0.61 | 0.02 | 0.00 | 0.03 |
| 11 | 2022 | 2899 | 0.11 | 104 | 102 | 105 | 0.62 | 0.00 | 0.01 | -0.01 |
| 12 | 2023 | 10185 | 0.13 | 105 | 104 | 106 | 0.66 | -0.01 | -0.02 | 0.00 |
| 13 | 2024 | 691 | -0.02 | 105 | 105 | 106 | 0.73 | -0.07 | -0.04 | -0.06 |

### JER 'fert' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 357 | -0.67 | 93 | 93 | 94 | 0.73 | 0.24 | 0.34 | 0.05 |
| 2 | 2013 | 361 | -0.61 | 94 | 93 | 95 | 0.77 | 0.26 | 0.35 | 0.05 |
| 3 | 2014 | 517 | -0.36 | 96 | 95 | 98 | 0.68 | 0.15 | 0.35 | -0.06 |
| 4 | 2015 | 1108 | 0.48 | 97 | 96 | 97 | 0.72 | 0.22 | 0.39 | 0.01 |
| 5 | 2016 | 1528 | 0.45 | 97 | 97 | 96 | 0.71 | 0.21 | 0.35 | 0.01 |
| 6 | 2017 | 1587 | 0.43 | 99 | 98 | 98 | 0.71 | 0.23 | 0.34 | 0.05 |
| 7 | 2018 | 1662 | 0.50 | 101 | 98 | 102 | 0.71 | 0.17 | 0.27 | -0.01 |
| 8 | 2019 | 1886 | 0.50 | 99 | 99 | 99 | 0.67 | 0.20 | 0.27 | 0.07 |
| 9 | 2020 | 1832 | 0.48 | 100 | 100 | 100 | 0.65 | 0.17 | 0.29 | 0.03 |
| 10 | 2021 | 431 | 0.50 | 105 | 100 | 109 | 0.73 | 0.21 | 0.32 | 0.01 |
| 11 | 2022 | 861 | 0.62 | 104 | 101 | 105 | 0.69 | 0.15 | 0.26 | -0.01 |
| 12 | 2023 | 2960 | 0.76 | 105 | 104 | 105 | 0.74 | 0.22 | 0.32 | 0.00 |
| 13 | 2024 | 226 | 0.56 | 105 | 105 | 105 | 0.78 | 0.21 | 0.28 | -0.02 |

### RDC 'icf ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 101 | 0.22 | 98 | 96 | 100 | 0.67 | -0.03 | 0.04 | -0.08 |
| 2 | 2013 | 244 | -0.31 | 95 | 94 | 96 | 0.49 | 0.04 | 0.00 | 0.05 |
| 3 | 2014 | 352 | 0.04 | 95 | 96 | 94 | 0.56 | 0.05 | 0.01 | 0.06 |
| 4 | 2015 | 652 | 0.48 | 96 | 96 | 96 | 0.56 | 0.05 | 0.01 | 0.05 |
| 5 | 2016 | 644 | 0.34 | 97 | 95 | 98 | 0.58 | 0.02 | 0.00 | 0.02 |
| 6 | 2017 | 899 | -0.16 | 96 | 96 | 96 | 0.54 | -0.04 | -0.01 | -0.05 |
| 7 | 2018 | 1232 | 0.19 | 99 | 97 | 100 | 0.59 | 0.01 | 0.01 | 0.00 |
| 8 | 2019 | 1468 | 0.24 | 99 | 97 | 100 | 0.60 | 0.01 | -0.01 | 0.02 |
| 9 | 2020 | 1636 | 0.32 | 101 | 99 | 102 | 0.65 | -0.01 | -0.02 | 0.02 |
| 10 | 2021 | 2055 | 0.21 | 101 | 99 | 102 | 0.64 | -0.02 | -0.01 | -0.02 |
| 11 | 2022 | 6432 | 0.17 | 102 | 101 | 104 | 0.65 | 0.00 | 0.00 | 0.01 |
| 12 | 2023 | 14841 | 0.16 | 102 | 101 | 103 | 0.64 | -0.02 | -0.01 | -0.01 |
| 13 | 2024 | 1566 | 0.12 | 103 | 102 | 103 | 0.68 | -0.04 | -0.04 | -0.01 |

### RDC 'icf ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 466 | -0.62 | 95 | 94 | 97 | 0.64 | 0.14 | 0.24 | -0.02 |
| 2 | 2013 | 461 | 0.22 | 95 | 95 | 95 | 0.50 | 0.09 | 0.29 | -0.04 |
| 3 | 2014 | 565 | -0.21 | 96 | 97 | 96 | 0.65 | 0.20 | 0.38 | -0.01 |
| 4 | 2015 | 831 | 0.19 | 97 | 97 | 97 | 0.61 | 0.18 | 0.25 | 0.05 |
| 5 | 2016 | 1340 | 0.18 | 98 | 97 | 99 | 0.66 | 0.20 | 0.28 | 0.04 |
| 6 | 2017 | 1864 | -0.05 | 96 | 97 | 96 | 0.65 | 0.17 | 0.26 | 0.01 |
| 7 | 2018 | 1973 | 0.25 | 99 | 97 | 100 | 0.63 | 0.14 | 0.22 | -0.01 |
| 8 | 2019 | 1819 | 0.18 | 99 | 97 | 99 | 0.67 | 0.19 | 0.24 | 0.05 |
| 9 | 2020 | 1470 | 0.19 | 100 | 98 | 102 | 0.70 | 0.20 | 0.27 | 0.02 |
| 10 | 2021 | 1421 | 0.47 | 101 | 99 | 102 | 0.69 | 0.17 | 0.24 | 0.02 |
| 11 | 2022 | 3208 | 0.46 | 102 | 100 | 103 | 0.72 | 0.19 | 0.30 | -0.02 |
| 12 | 2023 | 5769 | 0.52 | 103 | 100 | 104 | 0.71 | 0.18 | 0.31 | -0.01 |
| 13 | 2024 | 462 | 0.18 | 102 | 101 | 103 | 0.72 | 0.15 | 0.28 | -0.05 |

### RDC 'ifl ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 101 | -0.61 | 94 | 92 | 97 | 0.70 | 0.00 | -0.02 | 0.01 |
| 2 | 2013 | 244 | 0.00 | 93 | 94 | 92 | 0.62 | 0.06 | -0.02 | 0.10 |
| 3 | 2014 | 352 | 0.50 | 94 | 95 | 92 | 0.60 | -0.01 | 0.05 | -0.05 |
| 4 | 2015 | 652 | 0.44 | 95 | 94 | 96 | 0.59 | -0.01 | -0.04 | 0.02 |
| 5 | 2016 | 644 | 0.38 | 96 | 94 | 97 | 0.58 | 0.01 | 0.05 | -0.03 |
| 6 | 2017 | 899 | 0.47 | 97 | 96 | 96 | 0.59 | 0.00 | 0.03 | -0.02 |
| 7 | 2018 | 1232 | 0.44 | 99 | 97 | 100 | 0.63 | 0.00 | 0.01 | -0.01 |
| 8 | 2019 | 1468 | 0.72 | 99 | 97 | 100 | 0.54 | -0.03 | -0.04 | -0.01 |
| 9 | 2020 | 1636 | 0.88 | 102 | 99 | 104 | 0.61 | 0.03 | 0.02 | 0.02 |
| 10 | 2021 | 2055 | 0.47 | 101 | 100 | 101 | 0.65 | 0.04 | 0.04 | 0.02 |
| 11 | 2022 | 6432 | 0.31 | 103 | 102 | 104 | 0.64 | -0.02 | -0.01 | -0.02 |
| 12 | 2023 | 14841 | 0.25 | 104 | 103 | 105 | 0.66 | -0.03 | -0.02 | -0.02 |
| 13 | 2024 | 1566 | 0.24 | 105 | 104 | 106 | 0.69 | 0.01 | 0.00 | 0.01 |

### RDC 'ifl ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 466 | -0.97 | 94 | 94 | 97 | 0.67 | 0.21 | 0.36 | 0.00 |
| 2 | 2013 | 461 | 0.02 | 93 | 95 | 92 | 0.63 | 0.13 | 0.26 | -0.03 |
| 3 | 2014 | 565 | 0.14 | 95 | 97 | 94 | 0.66 | 0.18 | 0.28 | 0.01 |
| 4 | 2015 | 831 | 0.32 | 97 | 96 | 96 | 0.63 | 0.17 | 0.28 | 0.02 |
| 5 | 2016 | 1340 | 0.39 | 97 | 96 | 98 | 0.67 | 0.19 | 0.31 | 0.01 |
| 6 | 2017 | 1864 | 0.44 | 97 | 96 | 96 | 0.68 | 0.20 | 0.29 | 0.03 |
| 7 | 2018 | 1973 | 0.58 | 99 | 97 | 99 | 0.66 | 0.16 | 0.25 | 0.01 |
| 8 | 2019 | 1819 | 0.68 | 99 | 98 | 99 | 0.64 | 0.17 | 0.27 | 0.02 |
| 9 | 2020 | 1470 | 0.80 | 102 | 98 | 104 | 0.65 | 0.17 | 0.29 | 0.02 |
| 10 | 2021 | 1421 | 0.95 | 102 | 99 | 103 | 0.67 | 0.15 | 0.26 | -0.01 |
| 11 | 2022 | 3208 | 0.97 | 103 | 100 | 104 | 0.73 | 0.19 | 0.30 | -0.03 |
| 12 | 2023 | 5769 | 0.90 | 104 | 101 | 105 | 0.74 | 0.19 | 0.28 | -0.03 |
| 13 | 2024 | 462 | 0.57 | 105 | 102 | 106 | 0.73 | 0.13 | 0.22 | -0.06 |

### RDC 'fert' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 101 | -0.59 | 94 | 93 | 97 | 0.71 | 0.01 | -0.01 | 0.02 |
| 2 | 2013 | 244 | 0.04 | 94 | 94 | 93 | 0.63 | 0.06 | -0.01 | 0.10 |
| 3 | 2014 | 352 | 0.60 | 94 | 95 | 93 | 0.60 | -0.02 | 0.05 | -0.06 |
| 4 | 2015 | 652 | 0.49 | 96 | 95 | 96 | 0.60 | -0.02 | -0.04 | 0.01 |
| 5 | 2016 | 644 | 0.47 | 96 | 95 | 97 | 0.59 | 0.02 | 0.04 | -0.01 |
| 6 | 2017 | 899 | 0.41 | 97 | 96 | 97 | 0.60 | 0.02 | 0.04 | 0.00 |
| 7 | 2018 | 1232 | 0.43 | 99 | 97 | 100 | 0.63 | -0.01 | 0.01 | -0.02 |
| 8 | 2019 | 1468 | 0.64 | 99 | 98 | 100 | 0.53 | -0.03 | -0.04 | -0.01 |
| 9 | 2020 | 1636 | 0.80 | 102 | 99 | 104 | 0.60 | 0.03 | 0.01 | 0.02 |
| 10 | 2021 | 2055 | 0.42 | 101 | 100 | 101 | 0.66 | 0.05 | 0.04 | 0.03 |
| 11 | 2022 | 6432 | 0.33 | 103 | 102 | 103 | 0.64 | -0.01 | -0.01 | 0.00 |
| 12 | 2023 | 14841 | 0.28 | 104 | 103 | 105 | 0.66 | -0.03 | -0.02 | -0.02 |
| 13 | 2024 | 1566 | 0.23 | 105 | 103 | 106 | 0.70 | 0.01 | 0.00 | 0.01 |

### RDC 'fert' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 466 | -1.05 | 95 | 94 | 97 | 0.68 | 0.21 | 0.37 | 0.01 |
| 2 | 2013 | 461 | 0.07 | 94 | 95 | 92 | 0.64 | 0.12 | 0.25 | -0.04 |
| 3 | 2014 | 565 | 0.21 | 96 | 97 | 94 | 0.67 | 0.18 | 0.30 | 0.00 |
| 4 | 2015 | 831 | 0.34 | 97 | 97 | 96 | 0.64 | 0.17 | 0.28 | 0.02 |
| 5 | 2016 | 1340 | 0.40 | 98 | 97 | 98 | 0.68 | 0.19 | 0.31 | 0.00 |
| 6 | 2017 | 1864 | 0.37 | 97 | 97 | 96 | 0.69 | 0.20 | 0.31 | 0.02 |
| 7 | 2018 | 1973 | 0.56 | 99 | 97 | 99 | 0.67 | 0.16 | 0.26 | 0.01 |
| 8 | 2019 | 1819 | 0.63 | 99 | 98 | 99 | 0.63 | 0.16 | 0.27 | 0.02 |
| 9 | 2020 | 1470 | 0.75 | 102 | 99 | 104 | 0.64 | 0.18 | 0.30 | 0.02 |
| 10 | 2021 | 1421 | 0.93 | 102 | 99 | 102 | 0.68 | 0.17 | 0.26 | 0.01 |
| 11 | 2022 | 3208 | 0.96 | 103 | 100 | 103 | 0.74 | 0.21 | 0.30 | -0.01 |
| 12 | 2023 | 5769 | 0.87 | 104 | 101 | 105 | 0.74 | 0.19 | 0.28 | -0.02 |
| 13 | 2024 | 462 | 0.49 | 105 | 102 | 106 | 0.74 | 0.13 | 0.22 | -0.06 |

### HOL 'icf ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 34 | -2.31 | 92 | 92 | 97 | 0.58 | 0.02 | -0.22 | 0.25 |
| 2 | 2013 | 76 | -0.63 | 95 | 91 | 100 | 0.73 | 0.06 | -0.03 | 0.12 |
| 3 | 2014 | 127 | 0.23 | 98 | 94 | 103 | 0.72 | 0.05 | 0.02 | 0.06 |
| 4 | 2015 | 239 | 0.47 | 99 | 96 | 101 | 0.56 | -0.11 | 0.02 | -0.15 |
| 5 | 2016 | 509 | -0.17 | 98 | 96 | 101 | 0.62 | -0.03 | 0.03 | -0.07 |
| 6 | 2017 | 857 | 0.00 | 100 | 97 | 102 | 0.60 | -0.04 | -0.03 | -0.03 |
| 7 | 2018 | 1274 | 0.15 | 103 | 99 | 107 | 0.63 | -0.01 | -0.01 | -0.01 |
| 8 | 2019 | 2360 | 0.59 | 102 | 100 | 103 | 0.64 | 0.00 | -0.02 | 0.02 |
| 9 | 2020 | 3387 | 0.24 | 103 | 102 | 105 | 0.63 | -0.03 | -0.01 | -0.03 |
| 10 | 2021 | 2025 | 0.50 | 103 | 102 | 104 | 0.67 | -0.02 | -0.03 | 0.01 |
| 11 | 2022 | 7461 | 0.20 | 103 | 103 | 103 | 0.69 | -0.02 | 0.00 | -0.04 |
| 12 | 2023 | 24902 | 0.08 | 104 | 103 | 105 | 0.69 | -0.01 | 0.01 | -0.02 |
| 13 | 2024 | 2593 | -0.16 | 103 | 103 | 103 | 0.69 | 0.00 | 0.00 | 0.00 |

### HOL'icf ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 169 | -0.30 | 94 | 93 | 97 | 0.73 | 0.18 | 0.29 | -0.02 |
| 2 | 2013 | 377 | -0.38 | 96 | 94 | 100 | 0.77 | 0.20 | 0.31 | 0.02 |
| 3 | 2014 | 450 | -0.51 | 96 | 93 | 101 | 0.77 | 0.31 | 0.35 | 0.08 |
| 4 | 2015 | 785 | -0.64 | 97 | 95 | 101 | 0.74 | 0.29 | 0.42 | 0.05 |
| 5 | 2016 | 1597 | -0.62 | 98 | 95 | 101 | 0.68 | 0.15 | 0.34 | -0.05 |
| 6 | 2017 | 2887 | -0.14 | 99 | 97 | 102 | 0.69 | 0.16 | 0.34 | -0.03 |
| 7 | 2018 | 3935 | -0.05 | 102 | 98 | 106 | 0.68 | 0.17 | 0.33 | -0.02 |
| 8 | 2019 | 4273 | 0.42 | 101 | 99 | 103 | 0.69 | 0.17 | 0.33 | -0.02 |
| 9 | 2020 | 4607 | 0.45 | 103 | 100 | 105 | 0.75 | 0.21 | 0.30 | 0.01 |
| 10 | 2021 | 1973 | 0.40 | 103 | 100 | 104 | 0.75 | 0.24 | 0.31 | 0.05 |
| 11 | 2022 | 5049 | 0.60 | 103 | 102 | 103 | 0.77 | 0.23 | 0.32 | 0.01 |
| 12 | 2023 | 13388 | 0.61 | 104 | 102 | 105 | 0.77 | 0.23 | 0.35 | 0.00 |
| 13 | 2024 | 1267 | 0.33 | 103 | 102 | 104 | 0.77 | 0.23 | 0.31 | 0.02 |

### HOL 'ifl ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 34 | -1.16 | 88 | 86 | 92 | 0.76 | 0.18 | -0.26 | 0.37 |
| 2 | 2013 | 76 | 0.45 | 90 | 86 | 94 | 0.71 | 0.07 | 0.18 | -0.08 |
| 3 | 2014 | 127 | 0.09 | 92 | 88 | 96 | 0.67 | 0.02 | 0.01 | 0.03 |
| 4 | 2015 | 239 | 0.73 | 94 | 91 | 96 | 0.66 | -0.04 | -0.02 | -0.03 |
| 5 | 2016 | 509 | -0.30 | 96 | 92 | 100 | 0.65 | -0.01 | 0.03 | -0.04 |
| 6 | 2017 | 857 | 0.06 | 99 | 93 | 104 | 0.61 | -0.05 | -0.03 | -0.04 |
| 7 | 2018 | 1274 | 0.32 | 101 | 95 | 106 | 0.61 | -0.04 | -0.04 | -0.02 |
| 8 | 2019 | 2360 | 1.09 | 102 | 98 | 104 | 0.62 | -0.03 | -0.01 | -0.03 |
| 9 | 2020 | 3387 | 1.18 | 105 | 100 | 108 | 0.64 | -0.03 | -0.01 | -0.03 |
| 10 | 2021 | 2025 | 1.29 | 106 | 101 | 108 | 0.68 | -0.01 | -0.04 | 0.03 |
| 11 | 2022 | 7461 | 0.60 | 108 | 105 | 109 | 0.70 | -0.01 | -0.02 | 0.01 |
| 12 | 2023 | 24902 | 0.39 | 107 | 106 | 108 | 0.70 | -0.02 | -0.02 | 0.00 |
| 13 | 2024 | 2593 | 0.05 | 108 | 107 | 109 | 0.70 | 0.01 | 0.01 | 0.01 |

### HOL'ifl ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 169 | -1.11 | 88 | 88 | 91 | 0.61 | 0.00 | 0.27 | -0.15 |
| 2 | 2013 | 377 | -0.26 | 91 | 89 | 93 | 0.79 | 0.26 | 0.38 | 0.03 |
| 3 | 2014 | 450 | -0.77 | 91 | 89 | 95 | 0.75 | 0.21 | 0.39 | -0.05 |
| 4 | 2015 | 785 | -0.95 | 92 | 90 | 97 | 0.75 | 0.26 | 0.40 | 0.03 |
| 5 | 2016 | 1597 | -0.93 | 94 | 91 | 99 | 0.71 | 0.18 | 0.35 | -0.04 |
| 6 | 2017 | 2887 | -0.54 | 97 | 92 | 103 | 0.69 | 0.17 | 0.34 | -0.02 |
| 7 | 2018 | 3935 | -0.06 | 100 | 94 | 105 | 0.70 | 0.18 | 0.33 | -0.02 |
| 8 | 2019 | 4273 | 0.88 | 101 | 97 | 104 | 0.71 | 0.20 | 0.33 | 0.01 |
| 9 | 2020 | 4607 | 1.23 | 104 | 99 | 108 | 0.73 | 0.20 | 0.30 | 0.02 |
| 10 | 2021 | 1973 | 1.33 | 105 | 100 | 108 | 0.77 | 0.24 | 0.31 | 0.03 |
| 11 | 2022 | 5049 | 1.62 | 107 | 102 | 109 | 0.77 | 0.24 | 0.31 | 0.04 |
| 12 | 2023 | 13388 | 1.64 | 108 | 104 | 108 | 0.78 | 0.25 | 0.33 | 0.03 |
| 13 | 2024 | 1267 | 0.96 | 107 | 104 | 109 | 0.78 | 0.26 | 0.30 | 0.07 |

### HOL 'fert' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 34 | -1.13 | 89 | 87 | 93 | 0.75 | 0.18 | -0.23 | 0.35 |
| 2 | 2013 | 76 | 0.62 | 91 | 86 | 94 | 0.72 | 0.05 | 0.17 | -0.10 |
| 3 | 2014 | 127 | -0.01 | 92 | 88 | 97 | 0.67 | 0.02 | 0.00 | 0.03 |
| 4 | 2015 | 239 | 0.91 | 95 | 92 | 96 | 0.68 | -0.01 | 0.00 | -0.02 |
| 5 | 2016 | 509 | -0.17 | 96 | 93 | 100 | 0.66 | 0.00 | 0.04 | -0.04 |
| 6 | 2017 | 857 | 0.18 | 99 | 94 | 104 | 0.61 | -0.05 | -0.03 | -0.04 |
| 7 | 2018 | 1274 | 0.42 | 101 | 96 | 105 | 0.62 | -0.04 | -0.04 | -0.02 |
| 8 | 2019 | 2360 | 1.03 | 102 | 98 | 104 | 0.62 | -0.03 | -0.01 | -0.03 |
| 9 | 2020 | 3387 | 1.15 | 105 | 100 | 107 | 0.63 | -0.03 | -0.01 | -0.04 |
| 10 | 2021 | 2025 | 1.35 | 106 | 101 | 108 | 0.67 | -0.01 | -0.04 | 0.03 |
| 11 | 2022 | 7461 | 0.68 | 107 | 105 | 108 | 0.68 | -0.02 | -0.02 | 0.00 |
| 12 | 2023 | 24902 | 0.50 | 107 | 106 | 107 | 0.69 | -0.02 | -0.02 | 0.00 |
| 13 | 2024 | 2593 | 0.17 | 107 | 107 | 108 | 0.70 | 0.01 | 0.01 | 0.01 |

### HOL'fert' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 169 | -0.99 | 89 | 88 | 91 | 0.61 | -0.02 | 0.26 | -0.16 |
| 2 | 2013 | 377 | -0.19 | 92 | 90 | 94 | 0.79 | 0.27 | 0.40 | 0.03 |
| 3 | 2014 | 450 | -0.70 | 92 | 90 | 96 | 0.75 | 0.23 | 0.39 | -0.03 |
| 4 | 2015 | 785 | -0.83 | 93 | 91 | 97 | 0.75 | 0.25 | 0.39 | 0.02 |
| 5 | 2016 | 1597 | -0.87 | 95 | 92 | 100 | 0.71 | 0.17 | 0.35 | -0.05 |
| 6 | 2017 | 2887 | -0.43 | 98 | 93 | 103 | 0.69 | 0.17 | 0.34 | -0.01 |
| 7 | 2018 | 3935 | 0.02 | 100 | 95 | 105 | 0.71 | 0.18 | 0.33 | -0.02 |
| 8 | 2019 | 4273 | 0.83 | 101 | 97 | 104 | 0.71 | 0.20 | 0.33 | 0.01 |
| 9 | 2020 | 4607 | 1.21 | 104 | 99 | 107 | 0.73 | 0.20 | 0.30 | 0.01 |
| 10 | 2021 | 1973 | 1.39 | 105 | 100 | 108 | 0.76 | 0.23 | 0.31 | 0.03 |
| 11 | 2022 | 5049 | 1.69 | 107 | 102 | 108 | 0.75 | 0.23 | 0.31 | 0.03 |
| 12 | 2023 | 13388 | 1.75 | 107 | 104 | 107 | 0.76 | 0.24 | 0.33 | 0.03 |
| 13 | 2024 | 1267 | 1.09 | 107 | 104 | 108 | 0.78 | 0.27 | 0.32 | 0.07 |

### JER 'claw ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 477 | 0.02 | 100 | 103 | 97 | 0.56 | 0.02 | -0.03 | 0.04 |
| 2 | 2013 | 937 | 0.33 | 99 | 101 | 97 | 0.56 | 0.01 | -0.02 | 0.03 |
| 3 | 2014 | 1463 | 0.01 | 101 | 101 | 102 | 0.58 | 0.02 | 0.02 | 0.01 |
| 4 | 2015 | 1832 | -0.03 | 99 | 100 | 98 | 0.53 | 0.00 | -0.02 | 0.00 |
| 5 | 2016 | 2053 | 0.02 | 100 | 101 | 98 | 0.47 | 0.00 | -0.03 | 0.02 |
| 6 | 2017 | 2477 | -0.27 | 101 | 101 | 101 | 0.54 | 0.01 | -0.02 | 0.03 |
| 7 | 2018 | 3053 | 0.13 | 100 | 101 | 99 | 0.52 | -0.03 | -0.02 | -0.02 |
| 8 | 2019 | 4236 | 0.12 | 100 | 101 | 98 | 0.52 | -0.03 | -0.01 | -0.03 |
| 9 | 2020 | 6085 | 0.00 | 99 | 100 | 98 | 0.53 | 0.00 | 0.02 | -0.01 |
| 10 | 2021 | 7686 | -0.04 | 101 | 100 | 102 | 0.56 | -0.01 | -0.01 | -0.01 |
| 11 | 2022 | 11485 | 0.00 | 100 | 100 | 100 | 0.60 | -0.02 | -0.01 | -0.02 |
| 12 | 2023 | 10265 | 0.06 | 100 | 101 | 100 | 0.60 | -0.01 | 0.00 | -0.01 |
| 13 | 2024 | 691 | 0.24 | 103 | 101 | 104 | 0.66 | 0.02 | -0.01 | 0.04 |

### JER 'claw ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 2252 | 0.04 | 101 | 104 | 97 | 0.62 | 0.16 | 0.32 | 0.01 |
| 2 | 2013 | 1311 | -0.10 | 100 | 103 | 98 | 0.67 | 0.20 | 0.35 | 0.04 |
| 3 | 2014 | 1361 | 0.08 | 103 | 103 | 102 | 0.67 | 0.20 | 0.36 | 0.01 |
| 4 | 2015 | 1708 | -0.29 | 101 | 102 | 100 | 0.60 | 0.14 | 0.31 | -0.01 |
| 5 | 2016 | 2107 | 0.17 | 101 | 102 | 100 | 0.52 | 0.10 | 0.26 | 0.00 |
| 6 | 2017 | 2277 | -0.11 | 101 | 102 | 101 | 0.60 | 0.15 | 0.25 | 0.03 |
| 7 | 2018 | 2465 | 0.11 | 99 | 102 | 97 | 0.59 | 0.10 | 0.22 | -0.03 |
| 8 | 2019 | 2829 | 0.14 | 100 | 101 | 98 | 0.60 | 0.12 | 0.22 | 0.00 |
| 9 | 2020 | 2702 | 0.02 | 100 | 101 | 98 | 0.60 | 0.13 | 0.20 | 0.01 |
| 10 | 2021 | 1918 | 0.37 | 102 | 101 | 102 | 0.63 | 0.14 | 0.21 | 0.00 |
| 11 | 2022 | 2929 | 0.48 | 101 | 101 | 101 | 0.69 | 0.17 | 0.21 | 0.01 |
| 12 | 2023 | 2325 | 0.34 | 101 | 102 | 100 | 0.66 | 0.15 | 0.19 | 0.02 |
| 13 | 2024 | 152 | 0.32 | 104 | 103 | 104 | 0.70 | 0.22 | 0.29 | 0.03 |

### RDC 'claw ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 459 | 0.13 | 98 | 96 | 100 | 0.66 | 0.06 | 0.09 | 0.01 |
| 2 | 2013 | 1032 | -0.20 | 96 | 95 | 97 | 0.66 | 0.06 | 0.06 | 0.03 |
| 3 | 2014 | 1534 | 0.16 | 98 | 97 | 99 | 0.63 | 0.00 | 0.00 | 0.00 |
| 4 | 2015 | 2182 | -0.02 | 98 | 97 | 99 | 0.55 | -0.01 | 0.01 | -0.02 |
| 5 | 2016 | 2532 | 0.07 | 98 | 97 | 98 | 0.61 | -0.01 | 0.02 | -0.03 |
| 6 | 2017 | 2970 | 0.09 | 99 | 98 | 99 | 0.61 | -0.02 | 0.01 | -0.02 |
| 7 | 2018 | 3858 | -0.05 | 100 | 98 | 101 | 0.61 | -0.02 | -0.01 | -0.01 |
| 8 | 2019 | 4790 | 0.16 | 100 | 98 | 101 | 0.61 | 0.01 | 0.02 | 0.00 |
| 9 | 2020 | 5648 | 0.18 | 102 | 99 | 104 | 0.65 | 0.00 | 0.02 | -0.03 |
| 10 | 2021 | 8708 | 0.20 | 103 | 100 | 106 | 0.68 | 0.00 | -0.01 | 0.00 |
| 11 | 2022 | 15868 | 0.29 | 104 | 101 | 105 | 0.70 | -0.01 | -0.01 | 0.00 |
| 12 | 2023 | 14844 | 0.14 | 104 | 103 | 105 | 0.71 | 0.00 | 0.01 | -0.01 |
| 13 | 2024 | 1566 | 0.42 | 105 | 103 | 106 | 0.67 | -0.07 | -0.03 | -0.07 |

### RDC 'claw ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 2575 | -0.04 | 97 | 95 | 99 | 0.71 | 0.25 | 0.40 | 0.03 |
| 2 | 2013 | 2069 | 0.17 | 97 | 96 | 99 | 0.71 | 0.20 | 0.35 | 0.01 |
| 3 | 2014 | 2129 | -0.04 | 97 | 96 | 99 | 0.72 | 0.21 | 0.32 | 0.01 |
| 4 | 2015 | 2627 | 0.19 | 98 | 97 | 99 | 0.63 | 0.15 | 0.33 | -0.01 |
| 5 | 2016 | 3774 | 0.01 | 97 | 97 | 98 | 0.67 | 0.17 | 0.34 | -0.02 |
| 6 | 2017 | 4654 | 0.14 | 98 | 97 | 99 | 0.68 | 0.18 | 0.29 | 0.02 |
| 7 | 2018 | 4890 | 0.08 | 99 | 98 | 100 | 0.69 | 0.17 | 0.30 | -0.01 |
| 8 | 2019 | 4413 | 0.10 | 99 | 98 | 100 | 0.67 | 0.16 | 0.29 | 0.00 |
| 9 | 2020 | 3955 | 0.18 | 101 | 98 | 104 | 0.72 | 0.19 | 0.28 | 0.01 |
| 10 | 2021 | 4612 | 0.22 | 103 | 99 | 106 | 0.74 | 0.18 | 0.27 | 0.00 |
| 11 | 2022 | 6270 | 0.45 | 103 | 100 | 105 | 0.77 | 0.22 | 0.29 | 0.01 |
| 12 | 2023 | 4669 | 0.35 | 104 | 101 | 106 | 0.77 | 0.22 | 0.30 | 0.01 |
| 13 | 2024 | 305 | -0.15 | 104 | 101 | 107 | 0.78 | 0.28 | 0.31 | 0.10 |

### HOL'claw ' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 196 | -0.09 | 96 | 94 | 99 | 0.73 | 0.01 | 0.02 | 0.00 |
| 2 | 2013 | 541 | 0.12 | 96 | 93 | 100 | 0.58 | -0.12 | -0.06 | -0.12 |
| 3 | 2014 | 753 | -0.06 | 97 | 94 | 100 | 0.62 | -0.02 | 0.03 | -0.05 |
| 4 | 2015 | 1336 | -0.23 | 98 | 95 | 101 | 0.64 | 0.02 | 0.02 | 0.01 |
| 5 | 2016 | 1827 | -0.12 | 100 | 96 | 104 | 0.65 | -0.02 | 0.02 | -0.05 |
| 6 | 2017 | 2714 | 0.20 | 101 | 97 | 104 | 0.58 | -0.04 | -0.01 | -0.04 |
| 7 | 2018 | 4050 | -0.08 | 102 | 99 | 106 | 0.64 | -0.02 | 0.00 | -0.03 |
| 8 | 2019 | 6404 | 0.12 | 104 | 100 | 107 | 0.64 | -0.01 | 0.01 | -0.02 |
| 9 | 2020 | 9539 | 0.11 | 104 | 101 | 106 | 0.69 | -0.02 | -0.02 | -0.01 |
| 10 | 2021 | 11688 | 0.07 | 104 | 102 | 107 | 0.70 | 0.00 | 0.00 | 0.00 |
| 11 | 2022 | 22606 | 0.09 | 104 | 103 | 105 | 0.70 | 0.00 | 0.00 | -0.01 |
| 12 | 2023 | 24929 | -0.01 | 105 | 104 | 106 | 0.70 | -0.02 | 0.00 | -0.02 |
| 13 | 2024 | 2593 | -0.01 | 105 | 104 | 107 | 0.72 | -0.01 | -0.01 | -0.01 |

### HOL 'claw ' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 1528 | -0.14 | 94 | 91 | 97 | 0.75 | 0.23 | 0.31 | 0.02 |
| 2 | 2013 | 2460 | -0.27 | 95 | 92 | 99 | 0.74 | 0.22 | 0.33 | 0.00 |
| 3 | 2014 | 2335 | -0.04 | 97 | 93 | 100 | 0.66 | 0.14 | 0.31 | -0.04 |
| 4 | 2015 | 2834 | -0.18 | 97 | 93 | 101 | 0.70 | 0.16 | 0.31 | -0.04 |
| 5 | 2016 | 4713 | -0.32 | 99 | 95 | 104 | 0.71 | 0.19 | 0.31 | -0.01 |
| 6 | 2017 | 6614 | -0.19 | 100 | 96 | 104 | 0.66 | 0.16 | 0.30 | -0.01 |
| 7 | 2018 | 8927 | -0.10 | 102 | 98 | 106 | 0.70 | 0.18 | 0.31 | -0.01 |
| 8 | 2019 | 9161 | 0.12 | 103 | 99 | 107 | 0.71 | 0.18 | 0.27 | 0.01 |
| 9 | 2020 | 9092 | 0.12 | 103 | 100 | 106 | 0.74 | 0.18 | 0.26 | -0.03 |
| 10 | 2021 | 7945 | 0.04 | 104 | 100 | 107 | 0.76 | 0.18 | 0.24 | -0.01 |
| 11 | 2022 | 12064 | 0.30 | 104 | 102 | 105 | 0.75 | 0.18 | 0.26 | -0.02 |
| 12 | 2023 | 10697 | 0.20 | 104 | 103 | 106 | 0.77 | 0.21 | 0.29 | -0.01 |
| 13 | 2024 | 839 | 0.18 | 105 | 103 | 107 | 0.79 | 0.20 | 0.29 | -0.03 |

### JER 'GH' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 180 | -0.35 | 95 | 95 | 96 | 0.64 | 0.12 | 0.21 | -0.03 |
| 2 | 2013 | 356 | -0.06 | 97 | 95 | 100 | 0.56 | -0.02 | -0.11 | 0.08 |
| 3 | 2014 | 660 | 0.01 | 98 | 95 | 100 | 0.57 | -0.01 | 0.01 | -0.02 |
| 4 | 2015 | 1014 | -0.06 | 98 | 97 | 98 | 0.56 | -0.03 | -0.07 | 0.02 |
| 5 | 2016 | 1287 | -0.22 | 99 | 97 | 101 | 0.59 | 0.02 | 0.01 | 0.01 |
| 6 | 2017 | 1526 | -0.03 | 99 | 98 | 100 | 0.62 | 0.01 | -0.01 | 0.01 |
| 7 | 2018 | 1977 | -0.19 | 100 | 98 | 103 | 0.54 | -0.01 | -0.01 | -0.01 |
| 8 | 2019 | 3052 | 0.07 | 100 | 99 | 100 | 0.56 | -0.02 | 0.00 | -0.03 |
| 9 | 2020 | 5832 | 0.10 | 101 | 100 | 101 | 0.60 | -0.01 | -0.01 | -0.01 |
| 10 | 2021 | 11112 | 0.10 | 102 | 100 | 105 | 0.61 | -0.02 | -0.01 | -0.01 |
| 11 | 2022 | 11834 | 0.05 | 103 | 101 | 105 | 0.67 | 0.00 | -0.01 | 0.01 |
| 12 | 2023 | 10265 | 0.08 | 104 | 102 | 106 | 0.69 | 0.02 | 0.01 | 0.03 |
| 13 | 2024 | 691 | 0.04 | 105 | 103 | 107 | 0.71 | 0.11 | 0.05 | 0.10 |

### JER 'GH' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 764 | -0.34 | 96 | 96 | 96 | 0.61 | 0.12 | 0.23 | -0.03 |
| 2 | 2013 | 598 | -0.26 | 97 | 96 | 99 | 0.66 | 0.13 | 0.23 | -0.02 |
| 3 | 2014 | 751 | -0.11 | 98 | 96 | 100 | 0.65 | 0.19 | 0.35 | -0.03 |
| 4 | 2015 | 1348 | 0.21 | 98 | 96 | 98 | 0.61 | 0.15 | 0.26 | 0.01 |
| 5 | 2016 | 1788 | 0.06 | 99 | 97 | 101 | 0.65 | 0.15 | 0.28 | -0.01 |
| 6 | 2017 | 1925 | -0.02 | 99 | 98 | 100 | 0.65 | 0.13 | 0.24 | -0.02 |
| 7 | 2018 | 2237 | 0.01 | 100 | 98 | 102 | 0.58 | 0.10 | 0.21 | -0.01 |
| 8 | 2019 | 2627 | 0.05 | 99 | 99 | 100 | 0.62 | 0.13 | 0.26 | -0.01 |
| 9 | 2020 | 3301 | 0.17 | 101 | 100 | 101 | 0.66 | 0.14 | 0.25 | -0.01 |
| 10 | 2021 | 3715 | 0.05 | 103 | 100 | 105 | 0.69 | 0.15 | 0.23 | 0.00 |
| 11 | 2022 | 3551 | 0.16 | 103 | 101 | 105 | 0.75 | 0.19 | 0.24 | 0.01 |
| 12 | 2023 | 2874 | 0.28 | 104 | 102 | 106 | 0.76 | 0.23 | 0.30 | 0.02 |
| 13 | 2024 | 220 | -0.06 | 105 | 103 | 107 | 0.71 | 0.11 | 0.26 | -0.09 |

## RDC 'GH' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 161 | -0.36 | 98 | 97 | 100 | 0.53 | -0.20 | -0.09 | -0.21 |
| 2 | 2013 | 382 | -0.27 | 97 | 97 | 98 | 0.57 | 0.02 | -0.02 | 0.04 |
| 3 | 2014 | 649 | 0.01 | 98 | 98 | 98 | 0.61 | 0.03 | 0.03 | 0.01 |
| 4 | 2015 | 1001 | 0.08 | 99 | 98 | 99 | 0.59 | -0.01 | 0.04 | -0.05 |
| 5 | 2016 | 1092 | -0.04 | 100 | 98 | 102 | 0.62 | 0.01 | -0.01 | 0.02 |
| 6 | 2017 | 1544 | -0.04 | 98 | 98 | 98 | 0.58 | -0.02 | -0.02 | -0.02 |
| 7 | 2018 | 2089 | -0.01 | 100 | 100 | 101 | 0.64 | -0.01 | -0.02 | 0.00 |
| 8 | 2019 | 2469 | 0.19 | 100 | 99 | 100 | 0.60 | 0.01 | 0.02 | -0.01 |
| 9 | 2020 | 3422 | 0.17 | 102 | 100 | 104 | 0.64 | -0.01 | -0.04 | 0.02 |
| 10 | 2021 | 7673 | 0.07 | 102 | 101 | 103 | 0.67 | -0.01 | -0.02 | 0.01 |
| 11 | 2022 | 15876 | 0.10 | 103 | 101 | 105 | 0.68 | 0.00 | 0.00 | 0.01 |
| 12 | 2023 | 14844 | -0.01 | 104 | 102 | 105 | 0.70 | 0.00 | 0.00 | 0.00 |
| 13 | 2024 | 1566 | 0.05 | 104 | 103 | 105 | 0.72 | -0.02 | -0.01 | -0.02 |

## RDC 'GH' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 697 | -0.12 | 98 | 98 | 99 | 0.67 | 0.21 | 0.29 | 0.03 |
| 2 | 2013 | 854 | -0.05 | 99 | 99 | 99 | 0.63 | 0.14 | 0.27 | -0.03 |
| 3 | 2014 | 1058 | -0.08 | 99 | 99 | 99 | 0.68 | 0.17 | 0.32 | -0.02 |
| 4 | 2015 | 1509 | -0.09 | 99 | 99 | 99 | 0.66 | 0.21 | 0.33 | 0.02 |
| 5 | 2016 | 2268 | -0.05 | 100 | 99 | 101 | 0.70 | 0.21 | 0.31 | 0.03 |
| 6 | 2017 | 2915 | -0.03 | 99 | 99 | 98 | 0.66 | 0.15 | 0.28 | -0.02 |
| 7 | 2018 | 3076 | 0.18 | 100 | 99 | 101 | 0.69 | 0.18 | 0.26 | 0.01 |
| 8 | 2019 | 2844 | 0.15 | 100 | 99 | 100 | 0.66 | 0.16 | 0.26 | 0.01 |
| 9 | 2020 | 2902 | 0.22 | 102 | 100 | 104 | 0.71 | 0.20 | 0.30 | 0.00 |
| 10 | 2021 | 4625 | 0.20 | 102 | 100 | 103 | 0.75 | 0.21 | 0.30 | -0.01 |
| 11 | 2022 | 7223 | 0.16 | 103 | 100 | 105 | 0.76 | 0.22 | 0.31 | 0.00 |
| 12 | 2023 | 5084 | 0.22 | 103 | 101 | 105 | 0.77 | 0.21 | 0.31 | -0.02 |
| 13 | 2024 | 316 | -0.03 | 103 | 101 | 105 | 0.79 | 0.25 | 0.30 | 0.00 |

### HOL 'GH' geno females without pheno, with genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 80 | 0.01 | 96 | 92 | 99 | 0.58 | -0.02 | 0.04 | -0.07 |
| 2 | 2013 | 243 | 0.55 | 98 | 93 | 101 | 0.64 | -0.01 | -0.04 | 0.02 |
| 3 | 2014 | 288 | -0.10 | 97 | 94 | 100 | 0.62 | 0.07 | 0.05 | 0.06 |
| 4 | 2015 | 559 | 0.17 | 97 | 96 | 98 | 0.55 | -0.14 | -0.03 | -0.15 |
| 5 | 2016 | 868 | -0.24 | 99 | 96 | 103 | 0.64 | -0.04 | -0.04 | -0.01 |
| 6 | 2017 | 1393 | -0.01 | 101 | 97 | 105 | 0.60 | 0.01 | 0.02 | 0.00 |
| 7 | 2018 | 2043 | -0.04 | 104 | 99 | 108 | 0.59 | -0.03 | -0.04 | 0.00 |
| 8 | 2019 | 3437 | 0.47 | 103 | 100 | 105 | 0.66 | -0.03 | -0.04 | 0.00 |
| 9 | 2020 | 8199 | 0.51 | 105 | 103 | 106 | 0.64 | -0.02 | -0.03 | 0.00 |
| 10 | 2021 | 15320 | 0.41 | 105 | 103 | 106 | 0.65 | -0.01 | -0.01 | -0.01 |
| 11 | 2022 | 23008 | 0.26 | 105 | 104 | 105 | 0.67 | -0.01 | -0.01 | -0.01 |
| 12 | 2023 | 24931 | 0.12 | 106 | 104 | 108 | 0.69 | 0.00 | 0.00 | 0.00 |
| 13 | 2024 | 2593 | -0.09 | 106 | 104 | 107 | 0.72 | 0.00 | 0.01 | 0.00 |

### HOL'GH' geno females without pheno, without genotyped dam

| Obs | BYR | n | ms | ss | dam | sire | corr_ ms_ss | corr_ ms_pa | corr_ms_ dam | corr_ms_ sire |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2012 | 399 | -0.43 | 94 | 92 | 96 | 0.75 | 0.23 | 0.35 | 0.02 |
| 2 | 2013 | 776 | -0.71 | 96 | 93 | 100 | 0.71 | 0.20 | 0.31 | 0.02 |
| 3 | 2014 | 860 | -0.50 | 96 | 93 | 100 | 0.76 | 0.31 | 0.41 | 0.09 |
| 4 | 2015 | 1251 | -0.35 | 97 | 94 | 100 | 0.71 | 0.20 | 0.32 | 0.01 |
| 5 | 2016 | 2440 | -0.33 | 99 | 95 | 103 | 0.70 | 0.15 | 0.30 | -0.05 |
| 6 | 2017 | 4148 | -0.23 | 100 | 96 | 104 | 0.69 | 0.20 | 0.32 | 0.02 |
| 7 | 2018 | 5498 | -0.11 | 103 | 98 | 108 | 0.64 | 0.14 | 0.30 | -0.02 |
| 8 | 2019 | 5745 | 0.34 | 102 | 99 | 105 | 0.75 | 0.20 | 0.31 | -0.02 |
| 9 | 2020 | 9823 | 0.45 | 104 | 101 | 106 | 0.72 | 0.18 | 0.29 | -0.01 |
| 10 | 2021 | 12522 | 0.54 | 105 | 102 | 106 | 0.72 | 0.19 | 0.29 | -0.01 |
| 11 | 2022 | 14055 | 0.62 | 104 | 102 | 105 | 0.75 | 0.21 | 0.30 | 0.00 |
| 12 | 2023 | 12650 | 0.57 | 106 | 103 | 108 | 0.77 | 0.22 | 0.34 | -0.02 |
| 13 | 2024 | 1054 | 0.38 | 106 | 103 | 107 | 0.77 | 0.18 | 0.30 | -0.06 |