Table 1: Summary of infection challenges procedure followed by the four commercial cohorts (VNN\_A, VNN\_B, VIB and PAS).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | VNN\_A | VNN\_B | VIB | PAS |
| number of individuals |  | 1680 | 1737 | 2100 | 1200 |
| number of parents (sires / dams) |  | 59 / 20 | 39 / 14 | 60 / 18 | 50 / 23 |
| number of fullsib families |  | 248 | 69 | 333 | 126 |
| number of halfsib families |  | 79 | 53 | 78 | 73 |
| number of offspring per fullsib family min-max (mean) |  | 1 – 21 (5) | 1 – 82 (16) | 1 – 14 (4) | 1 – 44 (8) |
| number of individuals in pre-test |  | 180 | 150 | 430 | 89 |
| number of individuals challenged |  | 1350 | 1212 | 1475 | 960 |
| pathogen |  | RGNNV | RGNNV | *Vibrio harveyi* | *Photobacterium damselae subsp. piscicida* |
| strain |  | W80 | W80 | 94473 1811603 AQN553P2 | PP11787 6/94 |
| infection method |  | immersion | immersion | IP injection | IP injection |
| concentration |  | 1x105 TCID/mL | 1x105 TCID/mL | 2x108 CFU/fish | 3x1011 CFU/fish |
| water temperature (°C) |  | 27 ±2 | 27 ±2 | 22 ±2 | 24 ±2 |
| duration of the challenge (in days) |  | 27 | 42 | 13 | 10 |
| average survival rate |  | 45.2% | 59.7% | 59.0% | 40.0% |
| TCID : Tissue Culture Infectious Dose  CFU : Colony Forming Unit | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| population |  | PBLUP | | |  | GBLUP | | |
|  |  | linear model |  | threshold model |  | linear model |  | threshold model |
| VNN\_A |  | 0.238 (± 0.063) |  | 0.421 (± 0.106) |  | 0.232 (± 0.049) |  | 0.379 (± 0.065) |
| VNN\_B |  | 0.103 (± 0.048) |  | 0.214 (± 0.087) |  | 0.118 (± 0.043) |  | 0.217 (± 0.068) |
| VIB |  | 0.109 (± 0.043) |  | 0.198 (± 0.068) |  | 0.111 (± 0.040) |  | 0.198 (± 0.064) |
| PAS |  | 0.139 (± 0.051) |  | 0.291 (± 0.086) |  | 0.159 (± 0.045) |  | 0.295 (± 0.066) |

Table 2: Heritability estimated for VNN resistance in two European sea bass commercial cohorts (VNN\_A and VNN\_B), vibriosis resistance in one European sea bass commercial cohort (VIB) and pasteurellosis resistance in one gilthead sea bream commercial cohort (PAS) with pedigree-BLUP (PBLUP) or genomic-BLUP (GBLUP) using linear or threshold models using full density chips.

Values in parenthesis are the standard errors

Table 3 : Prediction accuracy for VNN resistance in two European sea bass commercial cohorts (VNN\_A and VNN\_B), vibriosis resistance in one European sea bass commercial cohort (VIB) and pasteurellosis resistance in one gilthead sea bream commercial cohort (PAS) using different training population sizes and marker densities. Prediction accuracy values are averaged over 100 replicates

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| data set | training population size | PBLUP | GBLUP\_1K | GBLUP\_3K | GBLUP\_6K | GBLUP\_10K | GBLUP\_full |
| VNN\_A | 50 | 0.34 | 0.31 | 0.33 | 0.34 | 0.33 | 0.18 |
| 100 | 0.42 | 0.39 | 0.41 | 0.42 | 0.41 | 0.26 |
| 150 | 0.49 | 0.45 | 0.47 | 0.49 | 0.47 | 0.32 |
| 200 | 0.51 | 0.47 | 0.49 | 0.51 | 0.49 | 0.35 |
| 300 | 0.55 | 0.51 | 0.53 | 0.55 | 0.53 | 0.40 |
| 400 | 0.58 | 0.54 | 0.56 | 0.58 | 0.56 | 0.44 |
| 500 | 0.61 | 0.55 | 0.58 | 0.61 | 0.59 | 0.47 |
| 600 | 0.61 | 0.56 | 0.59 | 0.62 | 0.59 | 0.49 |
| 700 | 0.63 | 0.57 | 0.60 | 0.63 | 0.61 | 0.50 |
| 800 | 0.64 | 0.59 | 0.62 | 0.65 | 0.62 | 0.52 |
| VNN\_B | 50 | 0.19 | 0.17 | 0.18 | 0.19 | 0.19 | 0.18 |
| 100 | 0.26 | 0.23 | 0.26 | 0.26 | 0.26 | 0.25 |
| 150 | 0.33 | 0.30 | 0.32 | 0.34 | 0.33 | 0.32 |
| 200 | 0.35 | 0.32 | 0.34 | 0.36 | 0.35 | 0.34 |
| 300 | 0.40 | 0.36 | 0.39 | 0.41 | 0.39 | 0.39 |
| 400 | 0.43 | 0.39 | 0.42 | 0.45 | 0.43 | 0.42 |
| 500 | 0.46 | 0.42 | 0.45 | 0.49 | 0.46 | 0.46 |
| 600 | 0.49 | 0.44 | 0.47 | 0.51 | 0.48 | 0.47 |
| 700 | 0.50 | 0.46 | 0.48 | 0.53 | 0.49 | 0.49 |
| 800 | 0.52 | 0.48 | 0.51 | 0.56 | 0.51 | 0.52 |
| VIB | 50 | 0.17 | 0.18 | 0.17 | 0.16 | 0.17 | 0.15 |
| 100 | 0.24 | 0.26 | 0.25 | 0.23 | 0.25 | 0.21 |
| 150 | 0.28 | 0.30 | 0.28 | 0.27 | 0.28 | 0.23 |
| 200 | 0.31 | 0.33 | 0.31 | 0.30 | 0.32 | 0.26 |
| 300 | 0.37 | 0.40 | 0.39 | 0.36 | 0.39 | 0.32 |
| 400 | 0.43 | 0.44 | 0.44 | 0.42 | 0.44 | 0.38 |
| 500 | 0.45 | 0.46 | 0.46 | 0.44 | 0.46 | 0.40 |
| 600 | 0.48 | 0.48 | 0.49 | 0.47 | 0.49 | 0.42 |
| 700 | 0.50 | 0.50 | 0.51 | 0.49 | 0.51 | 0.45 |
| 800 | 0.52 | 0.51 | 0.53 | 0.51 | 0.53 | 0.46 |
| PAS | 50 | 0.28 | 0.26 | 0.27 | 0.28 | 0.27 | 0.25 |
| 100 | 0.38 | 0.35 | 0.38 | 0.39 | 0.38 | 0.37 |
| 150 | 0.42 | 0.39 | 0.42 | 0.44 | 0.42 | 0.41 |
| 200 | 0.46 | 0.43 | 0.45 | 0.47 | 0.45 | 0.44 |
| 300 | 0.52 | 0.51 | 0.53 | 0.55 | 0.52 | 0.51 |
| 400 | 0.55 | 0.54 | 0.56 | 0.58 | 0.55 | 0.53 |
| 500 | 0.58 | 0.58 | 0.59 | 0.61 | 0.58 | 0.56 |
| 600 | 0.59 | 0.59 | 0.61 | 0.63 | 0.59 | 0.56 |
| 700 | 0.61 | 0.61 | 0.63 | 0.64 | 0.61 | 0.57 |

Table 4 : Relative prediction accuracy of estimated breeding values (in %) compared to GBLUP\_full for VNN resistance in two European sea bass commercial cohorts (VNN\_A and VNN\_B), vibriosis resistance in one European sea bass commercial cohort (VIB) and pasteurellosis resistance in one gilthead sea bream commercial cohort (PAS) using different training population sizes and marker densities.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| data set | training population size | PBLUP | GBLUP\_1K | GBLUP\_3K | GBLUP\_6K | GBLUP\_10K |
| VNN\_A | 50 | 51.8 | 91.7 | 96.5 | 97.9 | 100.1 |
| 150 | 65.6 | 91.8 | 95.8 | 96.7 | 99.5 |
| 300 | 73.4 | 92.0 | 95.9 | 97.0 | 99.9 |
| 500 | 77.6 | 91.0 | 95.7 | 96.4 | 99.5 |
| 800 | 80.3 | 90.4 | 95.3 | 95.5 | 98.7 |
| VNN\_B | 50 | 95.0 | 88.1 | 95.3 | 97.5 | 98.0 |
| 150 | 93.5 | 89.2 | 95.6 | 97.2 | 97.5 |
| 300 | 93.8 | 87.3 | 93.6 | 95.1 | 95.9 |
| 500 | 93.6 | 86.6 | 92.2 | 93.5 | 95.0 |
| 800 | 91.8 | 86.3 | 90.5 | 91.2 | 93.4 |
| VIB | 50 | 92.8 | 113.8 | 105.3 | 107.0 | 104.4 |
| 150 | 87.3 | 111.2 | 106.3 | 106.0 | 103.0 |
| 300 | 89.0 | 109.4 | 106.1 | 106.0 | 103.0 |
| 500 | 89.7 | 104.2 | 105.1 | 105.3 | 102.8 |
| 800 | 89.6 | 99.5 | 103.0 | 103.4 | 101.8 |
| PAS | 50 | 89.1 | 90.2 | 95.6 | 96.4 | 96.7 |
| 150 | 94.4 | 90.0 | 95.8 | 95.8 | 96.0 |
| 300 | 92.7 | 91.9 | 95.9 | 94.8 | 95.1 |
| 500 | 90.3 | 93.6 | 96.8 | 94.3 | 94.9 |
| 700 | 88.6 | 94.4 | 97.5 | 94.3 | 94.7 |