

SIM_08

Modular Breeding Program Simulator (MoBPS)

v1.6.62

Summary of settings

MoBPS scenarios

Scenario_1

Scenario_2

Scenario_3

Advanced settings

Advanced trait modelling

Repeatability

Maternal and paternal effects

Economic module

Advanced edge/node

Miraculix-active

Parallel computing + multiple simulation

Species (Chicken)

Time unit (Weeks)

Mutation rate (1×10^{-8})

Genetic data (Use Ensembl Map)

Ensemble dataset (Affymetrix Chicken600K Array)

Maximum number of SNPs (300K)

Advanced parallel computing

Number of simulations (1)

Number of simulations run in parallel (1)

Number of cores used per simulation (5)

Phenotype Information

Phenotype

Unit

Pheno.Mean

Pheno.SD

Heritability

Repeatability

Polygenic.Loci

Maternal.Trait

Paternal Trait

Major.QTL

Value.per.unit (euro-rupiah)

Major.QTL.syntax

SNP.NR.PHENO

Chromosome

Effect.AA

Effect.AB

Effect.BB

Allele.Freq(B)

Optional Info

Residual Correlation-Genetic Correlation Matrices

Creating own Selection Indexes

Creating own Phenotyping Classes

General economy parameters

Fixed.cost (euro)

Interest.rate (%)

Genotyping.cost.per.individual (euro)

Number.of.housing

Chicken.feeds.vaccines.and.supplements

Parameters for simulation

Table 1. Phenotypes and major QTLs

Traits	CHR	QTL peak/scan	QTL position	p	PHENO. μ (±SD)	Effect			Allele frequency	Polygenic loci	r	h ² (±SE)	Maternal	Paternal	Value (€)	Gene/SNP
						AA	AB	BB								
AFE	1	207 cM/205-215 cM	³ MCW0007/ ⁴ MCW0018	<0.05	159.95 d (1.1)	1.74	0.87	0.39	A(0.53)/B(0.47)	1000	0.6	0.51 (0.09)	0.065	11.98	1.3	<i>MTNR1B/JQ249894:g.63C>T</i>
BW49D	1	205/205-241 cM	MCW0018/MCW0058	0.0061	728.66 gr (16.3)	42.66	-8.66	-34.66	A(0.57)/B(0.43)	1000	0.6	0.413 (0.01)	10	0	2	<i>cGH/G+1705A</i>
BW56D	1	444/0-100 cM	Unidentified	<0.01	858.84 gr (158.84)	-23.8	58	11.41	A(0.43)/B(0.57)	1000	0.3	0.25	0.42	0	1	<i>ATGL/c.782G>A</i>
EN	1	145/122-205 cM	³ ADL0019/ ⁴ ADL0150	<0.05	84.58 count/d (6.07)	-14.22	40.34	30.56	A(0.41)/B(0.59)	1000	0.3	0.24 (0.07)	0	0	1.5	<i>rs14878430</i>
FCR	1	50/98-128 cM	³ MCW0011/ ⁴ ADL0307	<0.01	1.82 kg/kg (0.31)	0.01	0.11	1.64	A(0.95)/B(0.05)	1000	0.1	0.07 (0.01)	0.52	0	2.3	<i>USP44</i>
FEML	1	72.6/72-94 cM	² MCW0010/ ⁵ MCW0106	-	10.64 cm (0.84)	0.1	0.3	0.6	A(0.24)/B(0.76)	1000	0.95	0.92	0	1	1.05	<i>LRCH1</i>
TL	1	98/0-100 cM	¹ MCW0011	<0.05	15.21 cm (0.84)	0.11	0.53	1.9	A(0.23)/B(0.77)	1000	0.6	0.59	0	1	1.04	<i>LCORL/rs314487178</i>

¹Peak/²Upper.suggest/³Upper.sig/⁴Lower.sig/⁵Lower.suggest; AFE: Age at First Egg; BW49D: Body Weight 49 Days; BW56D: Body Weight 56 Days; EN: Egg Number; FCR: Feed Conversion Ratio; FEML: Femur Length; TL: Tibia Length.

Table 2. Residual and genetic correlation

	BW49D	AFE	BW56D	EN	FCR	FEML	TL
BW49D	1	-0.75	-0.5	0.25	0.5	-0.9	-0.9
AFE	-0.5	1	0.75	0.14	0.9	0.2	0.2
BW56D	-0.8	0.3	1	0.13	0.9	0.4	0.4
EN	0.8	-0.2	-0.4	1	0.6	-0.4	-0.43
FCR	0.95	0.85	0.95	0.6	1	0.1	0.2
FEML	-0.5	0.2	0.32	-0.21	0.54	1	0.6
TL	-0.25	0.4	0.43	-0.34	0.56	0.71	1

Below the diagonal is genetic correlation; above the diagonal is residual correlation; values are generated via MoBPS web server.

Table 3. Selection indexes and phenotyping classes

Selection indexes	Standardization	BW49D	AFE	BW56D	EN	FCR	FEML	TL
Broiler	Genomic SD ¹ , Breeding Value SD ² , Phenotypic SD ³	4	2	4	2	5	2	2
Pelung	Genomic SD ¹ , Breeding Value SD ² , Phenotypic SD ³	2	3	2	3	2	5	5
Phenotyping classes	Phenotyping cost	BW49D	AFE	BW56D	EN	FCR	FEML	TL
Fully phenotyped	50	50	50	50	50	50	50	50

¹Scenario_1; ²Scenario_2; ³Scenario_3; SD: Standard Deviation; AFE: Age at First Egg; BW49D: Body Weight 49 Days; BW56D: Body Weight 56 Days; EN: Egg Number; FCR: Feed Conversion Ratio; FEML: Femur Length; TL:

Tibia Length.

Table 4. General economy parameters

Fixed cost (€-Rp)	Interest rate (%)	Genotyping cost per individual (€)	Number of Housing (€)	Chicken feeds, vaccines, and supplements (€)
€ 50.729/Rp 857167.91	2.5	€50/Rp 844850	€100/Rp 1689700	€22.07/Rp 372916.79

Breeding schemes

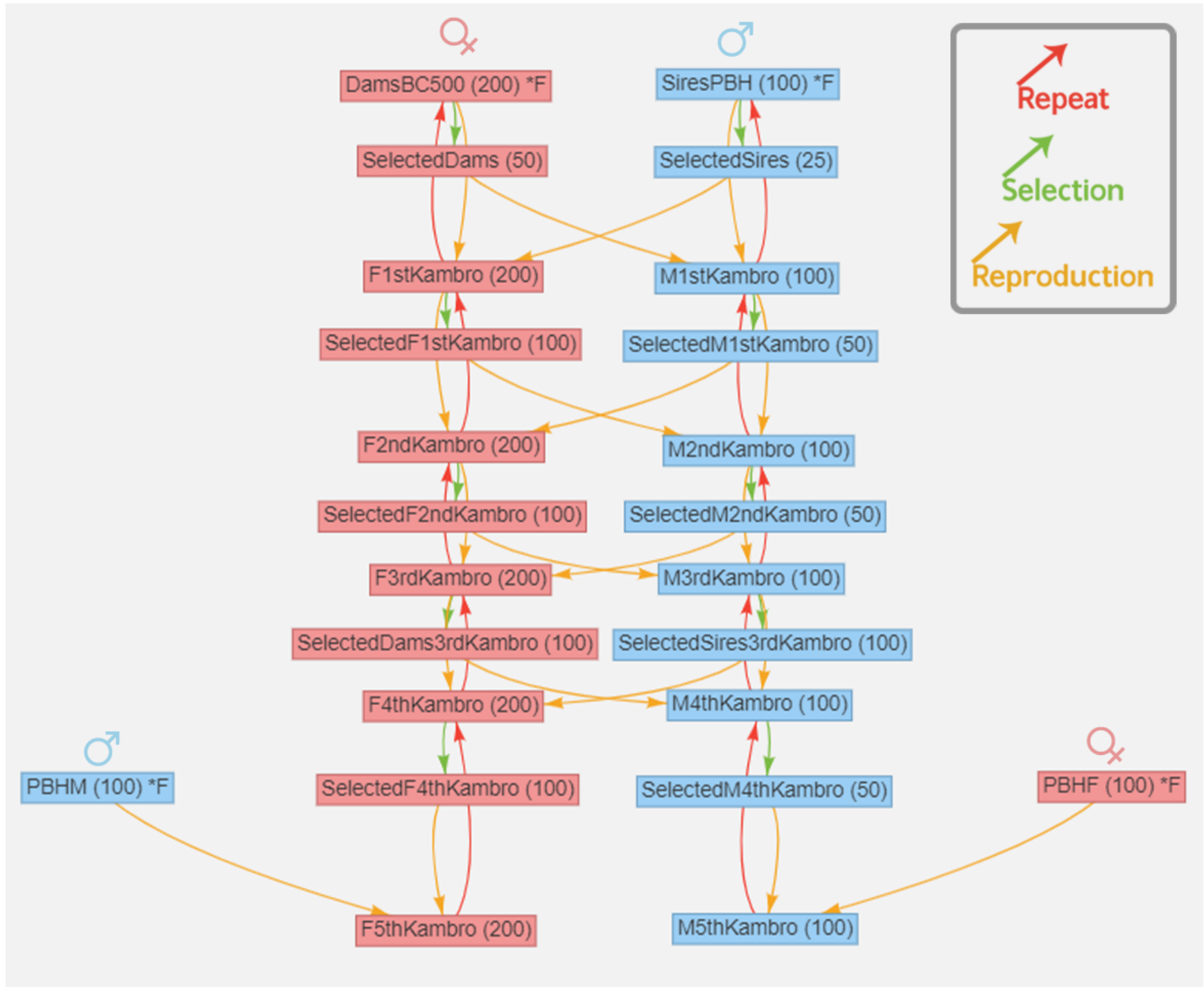


Fig 1. Breeding schemes

Economic projections

Cohort name	Nr. of individuals	Time-point	Total costs	Cost genotyping	Cost phenotyping	Cost housing	Repeats
DamsBC500	200	0	€ 24,414.00	€ 10,000.00	€ 10,000.00	€ 4,414.00	
SiresPBH	100	0	€ 12,207.00	€ 5,000.00	€ 5,000.00	€ 2,207.00	
PBHF	100	0	€ 12,207.00	€ 5,000.00	€ 5,000.00	€ 2,207.00	
PBHM	100	0	€ 12,207.00	€ 5,000.00	€ 5,000.00	€ 2,207.00	
SelectedSires	25	52	€ 565.54	€ -	€ -	€ 565.54	
SelectedDams	50	52	€ 1,131.09	€ -	€ -	€ 1,131.09	
F1stKambro	200	104	€ 25,649.96	€ 10,506.25	€ 10,506.25	€ 4,637.46	50x
M1stKambro	100	104	€ 12,824.98	€ 5,253.13	€ 5,253.13	€ 2,318.73	
SelectedF1stKambro	100	156	€ 594.17	€ -	€ -	€ 594.17	
SelectedM1stKambro	50	156	€ 1,188.35	€ -	€ -	€ 1,188.35	
F2ndKambro	200	208	€ 26,948.49	€ 11,038.13	€ 11,038.13	€ 4,872.23	50x
M2ndKambro	100	208	€ 13,474.24	€ 5,519.06	€ 5,519.06	€ 2,436.12	
SelectedF2ndKambro	100	260	€ 624.25	€ -	€ -	€ 624.25	
SelectedM2ndKambro	50	260	€ 1,248.51	€ -	€ -	€ 1,248.51	
F3rdKambro	200	312	€ 28,312.76	€ 11,596.93	€ 11,596.93	€ 5,118.89	50x
M3rdKambro	100	312	€ 14,156.38	€ 5,798.47	€ 5,798.47	€ 2,559.44	
SelectedDams3rdKambro	100	364	€ 655.86	€ -	€ -	€ 655.86	
SelectedSires3rdKambro	100	364	€ 1,311.71	€ -	€ -	€ 1,311.71	
F4thKambro	200	416	€ 29,746.09	€ 12,184.03	€ 12,184.03	€ 5,378.03	50x
M4thKambro	100	416	€ 14,873.04	€ 6,092.01	€ 6,092.01	€ 2,689.02	
SelectedF4thKambro	100	468	€ 689.06	€ -	€ -	€ 689.06	
SelectedM4thKambro	50	468	€ 1,378.12	€ -	€ -	€ 1,378.12	
F5thKambro	200	520	€ 31,251.98	€ 12,800.85	€ 12,800.85	€ 5,650.29	50x
M5thKambro	100	520	€ 15,625.99	€ 6,400.42	€ 6,400.42	€ 2,825.15	
113975 chickens	10 years		€ 283,285.57	€ 112,189.28	€ 112,189.28	€ 58,907.02	
COSTS (Rp)			Rp 4,786,676,276.29	Rp 1,895,662,264.16	Rp 1,895,662,264.16	Rp 995,351,916.94	

Fig 2. Economic projections