Breeding objectives of maternal and direct pig traits calculated applying gene-flow method

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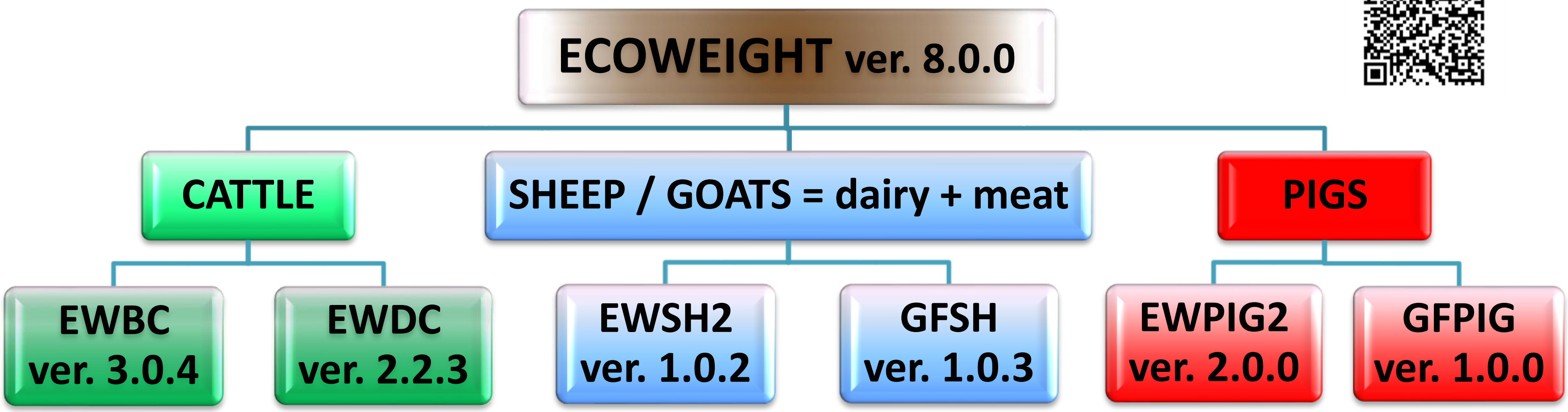
Brief Intro

- What does mean Economic Weight (EW)?
- How to calculate



Authors: Wolf J., Wolfová M., Krupa E., Krupová Z., Žáková E. (**www.vuzv.cz**)

Metods

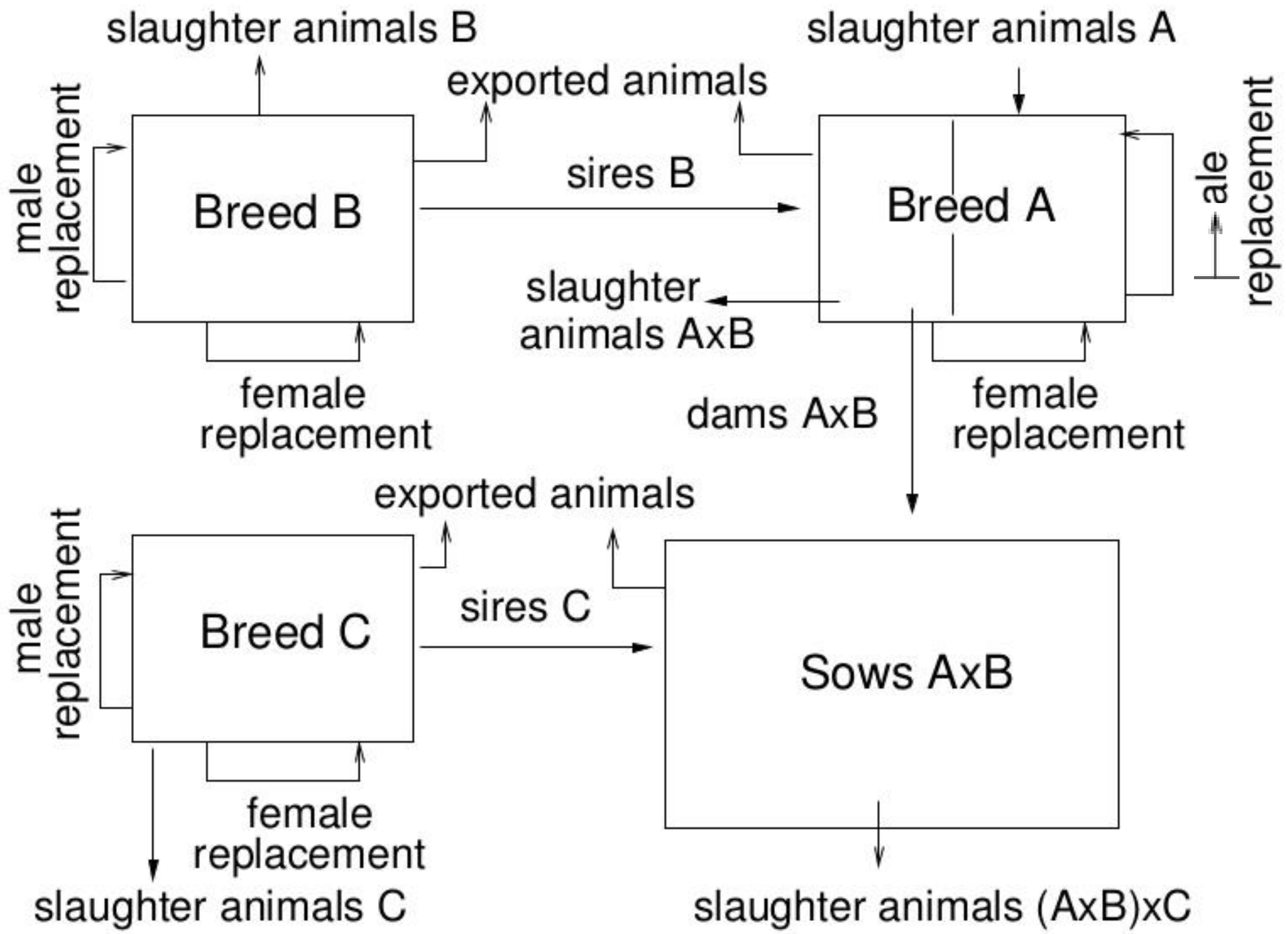
- Bio-economic model for marginal economic values: (*Wolfová et al., 2017 Liv. Sci*., researchgate.net -> search: "ecoweight pig manual")
- Number of Discounted Genes Expressions
  - Gene Flow (*Hill, 1974 Anim. Prod.; Danell et al., 1976, Acta Agric. Scand.*)
    - Flow of genes through population over time
  - Sex-age classes
  - Realization vectors
    - Direct, Maternal traits

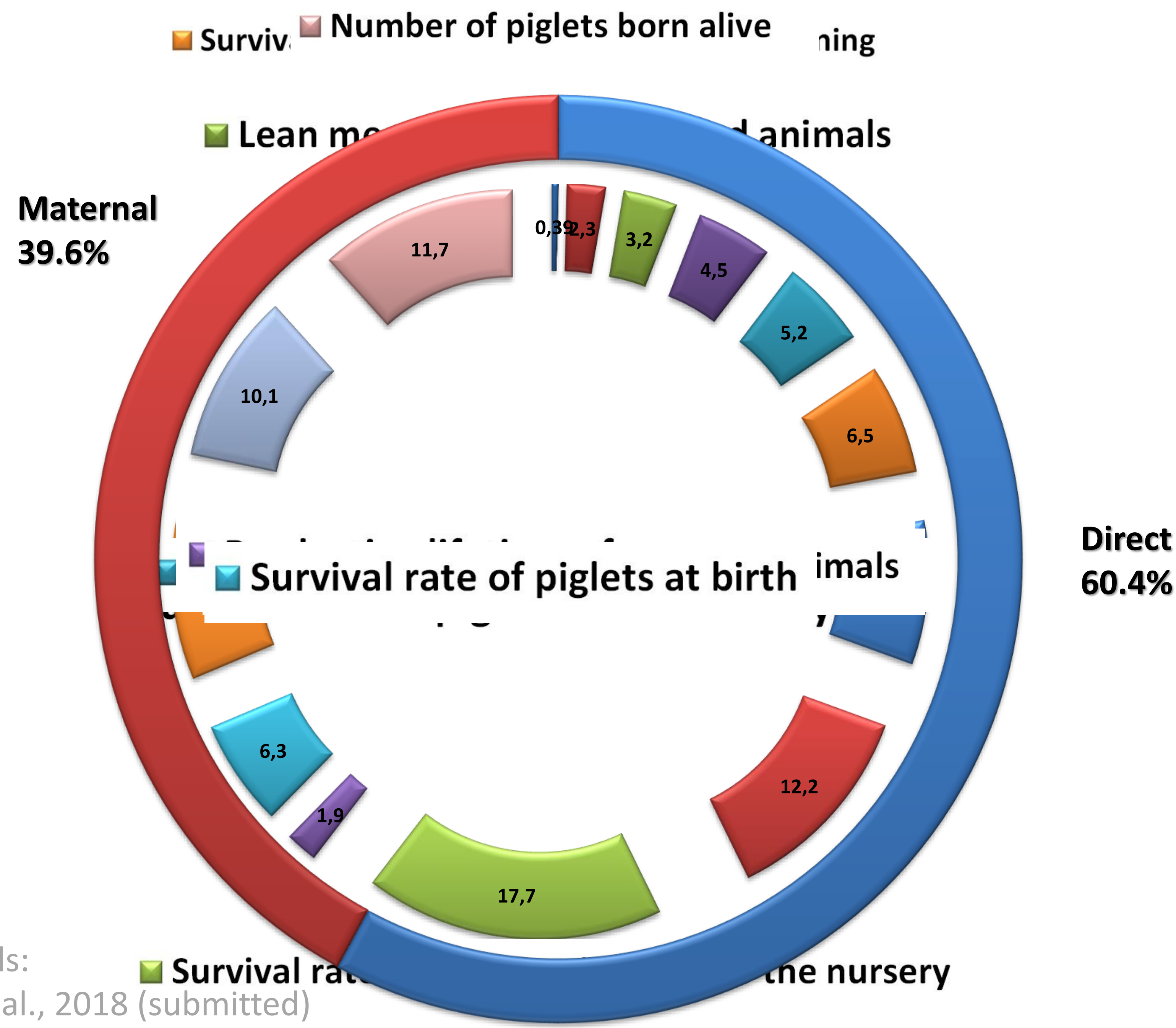
Wolfová, Nitter, Liv. Sci. 2004

$$\boldsymbol{P} = \begin{bmatrix} \boldsymbol{P}_{11} & \boldsymbol{P}_{12} & \cdots & \boldsymbol{P}_{1\boldsymbol{n}} \\ \boldsymbol{P}_{21} & \boldsymbol{P}_{22} & \cdots & \boldsymbol{P}_{2\boldsymbol{n}} \\ \vdots & \vdots & \ddots & \vdots \\ \boldsymbol{P}_{\boldsymbol{n}1} & \boldsymbol{P}_{\boldsymbol{n}2} & \cdots & \boldsymbol{P}_{\boldsymbol{nn}} \end{bmatrix}$$

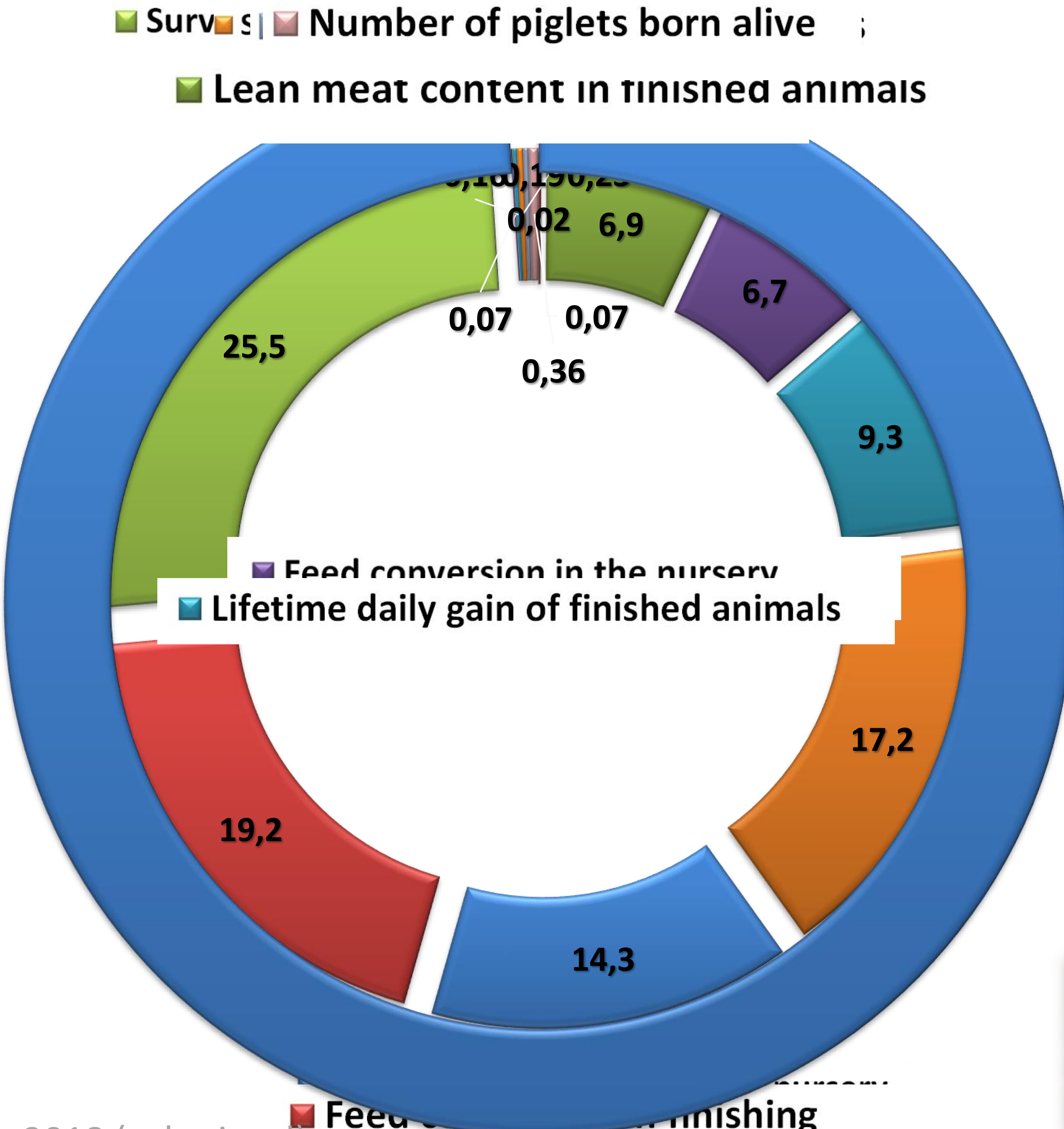
Data

- Production system of pigs: (*Krupa et al., 2017 Liv. Sci.)*
- Genetic evaluation of pigs in CR: *(Krupa et al., 2016 Liv. Sci.; Krupa and Wolf 2013 Czech J. Anim. Sci.)*
- Traits D: daily gain, age at first mating, conception rate, survival rate, dressing percentage, lean meat content, and feed conversion
- Traits M: number of piglets born alive, survival rate of piglets at birth and until weaning, conception rate of sows, and productive lifetime of sows.
- Inv.: 8 years; Discount rate: 2%


slaughter animals B
exported animals
slaughter animals A
male replacement
Breed B
sires B
Breed A
ale
replacement
slaughter animals AxB
female replacement
dams AxB
female replacement
exported animals
male replacement
Breed C
sires C
Sows AxB
female replacement
slaughter animals C
slaughter animals (AxB)xC



More details:
Wolfová et al., 2018 (submitted)



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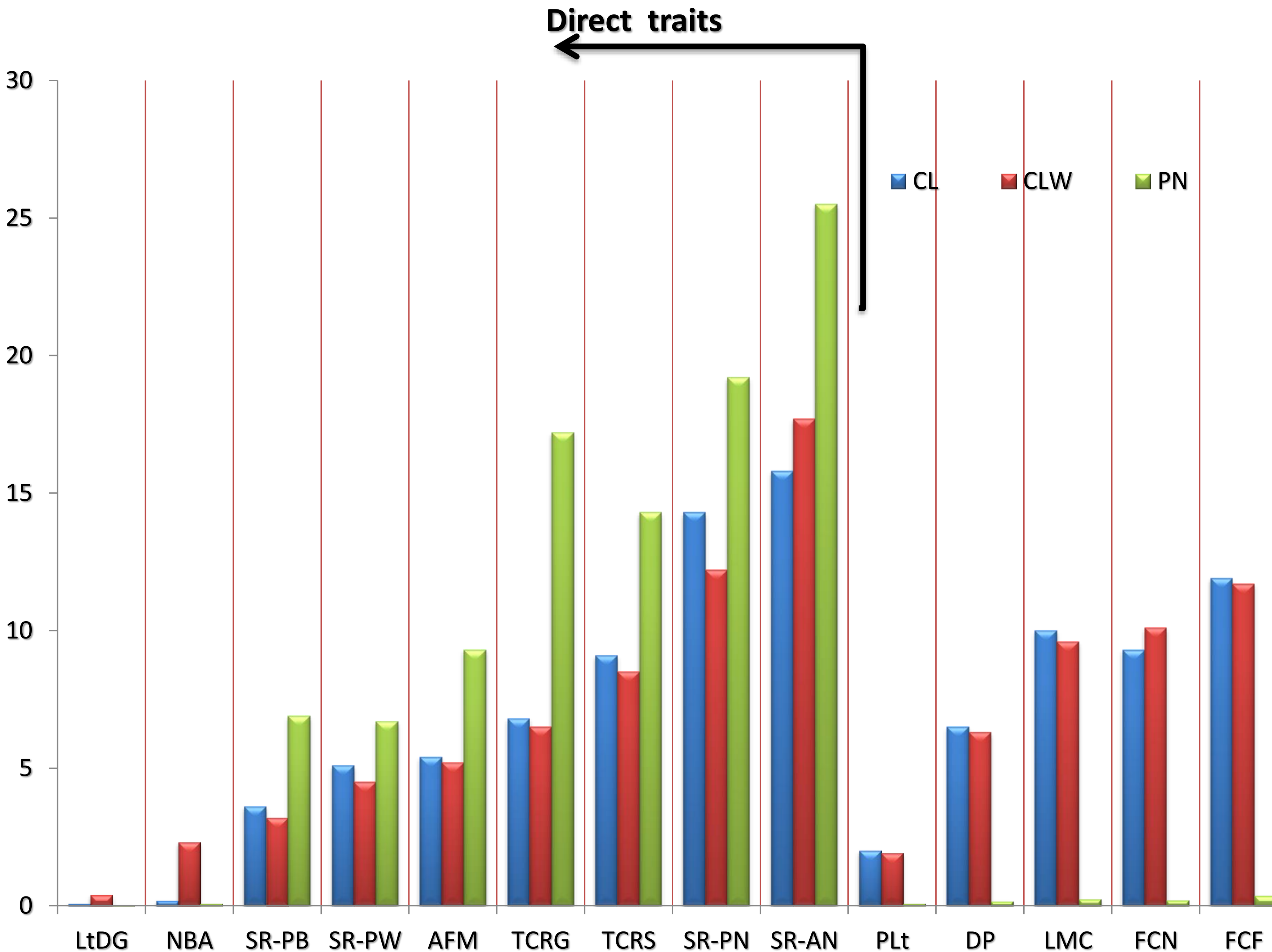
Direct traits
CL
CLW
PN
30
25
20
15
10
5
0
LtDG
NBA
SR-PB
SR-PW
AFM
TCRG
TCRS
SR-PN
SR-AN
PLt
DP
LMC
FCN
FCF

Take home message

- The presented gene-flow method enables calculation of the relative economic importance
- considering the whole population structure of pig crossbreeding systems
- considering the time delay between selection in purebred parental populations and trait expressions in several purebred and crossbred progeny generations.
- gene-flow method could be foregone when estimating the relative economic importance of pig traits.
- cannot be generalised for other pig breeding systems without further studies.

Fufure

- Ecoweight package
  - new traits
  - Non market values
- EcoWeight – another livestock
  - Rabbits (EwRab) on the way
  - Aquaculture: far future
- EcoWeight -> web based application

Thank you for Your attention

EcoWeight developer team

EcoWeight is:

- open source
- freelly available
- on request from the authors:

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$$\boldsymbol{m}^{t} = \boldsymbol{P}^{t} \times \boldsymbol{m}^{0}$$

$$msum = \sum_{t=1}^{inv} m^{t} \times (1+u)^{-t}$$

Sires of breed PN		Sires of breed CL	
Sex-age classes for PN sires	NDEs	Sex-age classes for CL sires	NDEs
1	1.256	1	1.398
2	1.164	2	1.299
3	2.053	3	2.183
4	1.944	4	2.069
5	1.836	5	1.957
6	1.731	6	1.850
7	1.629	7	
8	1.530		
Slaughter animal PN	1.256	Slaughter animal CL	1.399
Slaughter animal (CLW × CL) × PN	0.871	Slaughter animal CLW × CL	0.980
		Slaughter animal (CLW × CL) × PN	0.329

Sex-age classes for PN dams		Sex-age classes for CL dams	
1	1.256	1	1.398
2	1.164	2	1.299
3	1.073	3	1.203
4	0.982	4	1.108
5	0.894	5	1.015
6	0.870	6	0.926
7	0.724	7	0.838
8	0.642	8	0.750
9	0.567	9	0.666
10	0.504	10	0.582
		11	0.504
		12	0.444