

# Desired genetic gains for a breeding objective: A novel approach

P. Sae-Lim\*, H. Komen\*, A. Kause\*<sup>§</sup>, J. A. M. van Arendonk\*, A. J. Barfoot<sup>†</sup>, K. E. Martin<sup>†</sup>, J. E. Parsons<sup>†</sup>

## Participatory approach

- Analytical hierarchy process (AHP) and weighted goal programming (WGP) are widely used in social sciences for estimating individual and consensus preference values.

## Objective

- Use AHP and WGP to derive desired genetic gains for a breeding objective serving a global and diverse markets. Rainbow trout was used as a case study.

## Conclusions

- AHP and WGP can be used to define desired genetic gains that reflect a consensus in customer preferences.
- Production traits (FCR, survival, growth) are more preferred than processing or quality traits (maturation, fillet%, CF).

## Novel Approach

### Step 1 Data collection

**QUESTIONNAIRE –Part A**  
Rainbow trout farming

- 6 most important traits out of 13 traits.
- 178 farmers on 5 continents.



**QUESTIONNAIRE –Part B**  
Rainbow trout farming

6.8% faster growth | equal | 6% higher survival<sup>1</sup>

9 8 7 6 5 4 3 2 | 1 | 2 3 4 5 6 7 8 9<sup>2</sup>

Pairwise comparison combined with percentage of improvement<sup>1</sup> (G%) and intensity of preferences<sup>2</sup>

<sup>1</sup>= derived from literature

### Step 2 Desired gain derivation



## Results

Table 1 Potential maximum genetic improvement (G%, % of a trait mean), consensus preference value, and desired genetic gain (DesiredG%) for six most important traits.

Trait	G%	Consensus preference	DesiredG%
FCR	7.6%	0.258	1.96%
Survival (%)	6.0%	0.257	1.54%
Growth	6.8%	0.213	1.45%
Maturation (Day)	14.3%	0.114	1.63%
Fillet (%)	0.7%	0.094	0.07%
Condition factor	4.9%	0.064	0.31%



Take a Hand-out

\*Animal Breeding and Genomics Centre, Wageningen University, P. O. Box 338, 6700 AH, Wageningen, The Netherlands  
Email: [panya.sae@wur.nl](mailto:panya.sae@wur.nl)

<sup>§</sup>Current address: MTT Agrifood Research Finland, Biotechnology and Food Research, Biometrical Genetics, FI-31600 Jokioinen, Finland. Email: [antti.kause@mtt.fi](mailto:antti.kause@mtt.fi)

<sup>†</sup>Troutlodge, Inc. 12000 McCutcheon Rd. Sumner, WA 98390, USA  
Email: [abarfoot@troutlodge.com](mailto:abarfoot@troutlodge.com), [kyle@troutlodge.com](mailto:kyle@troutlodge.com), [parsons@troutlodge.com](mailto:parsons@troutlodge.com)