THE UNDERLYING BENEFITS OF IMPROVED FARM PERFORMANCE USING NOVAQPRO® MICROBIAL BIOMASS FOR TIGER SHRIMP *Penaeus monodon*

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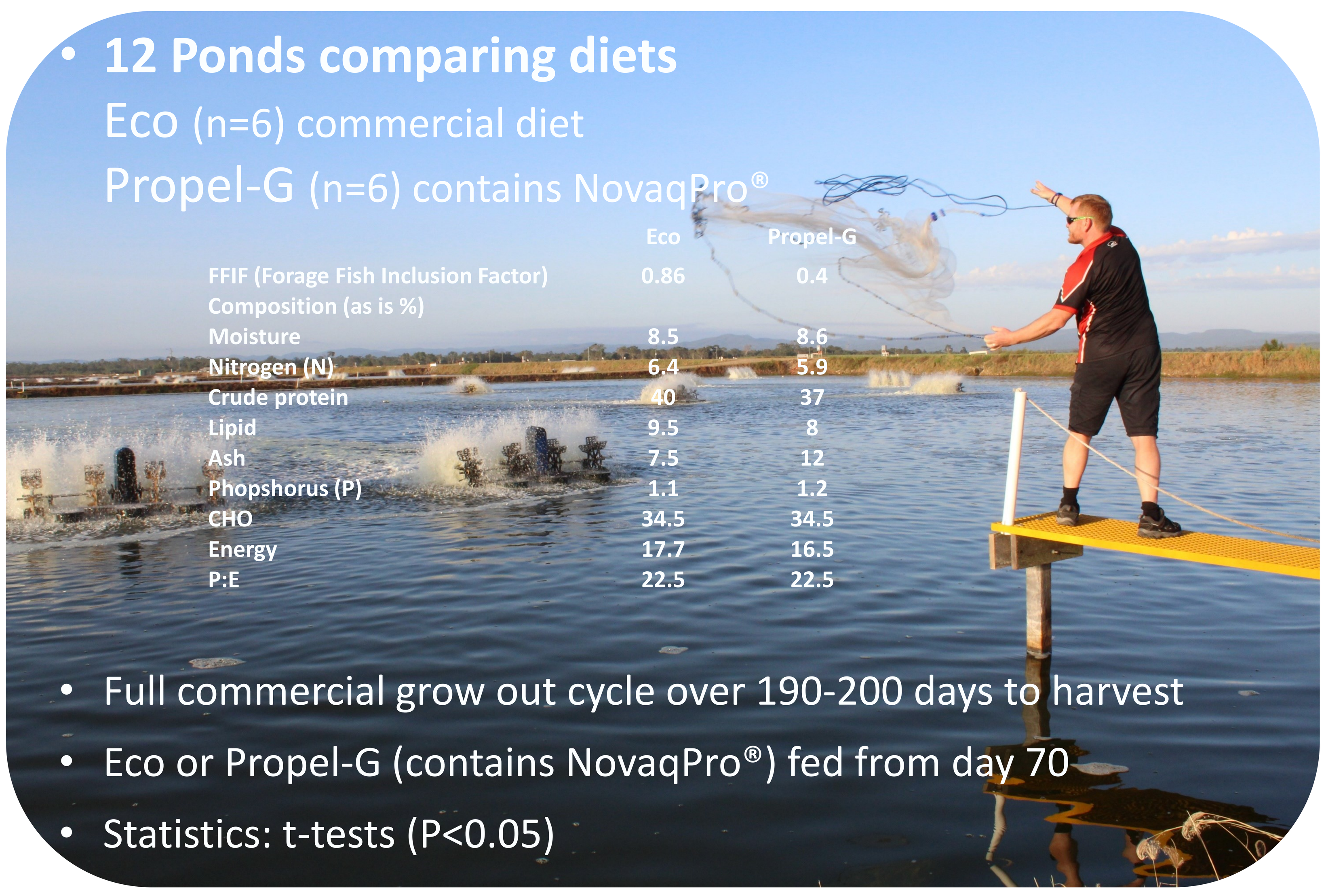
- Balancing the competing demands of increased feed costs and reduced farm gate prices with lowering marine capture resources and nutrient inputs is critical to ensure the long-term profitability and sustainability of shrimp farming.
- The use of least-cost formulations may seem attractive, but it often negatively impacts animal health and performance, reducing yields, water quality, and nutritional condition. Poor feed utilisation in turn affects water quality and lead to excessive nutrient emissions from the farm.
- The inclusion of a microbial biomass commercialised as NovaqPro® has enabled greater flexibility in formulations, for instance the reduction of protein and marine resources in the diet of shrimp[1,2], and improving survival through disease resistance and immune stimulation[3,4].
- To characterise the benefits at the commercial scale, a replicated pond experiment was conducted at Australian Prawn Farms in Australia



- **12 Ponds comparing diets**

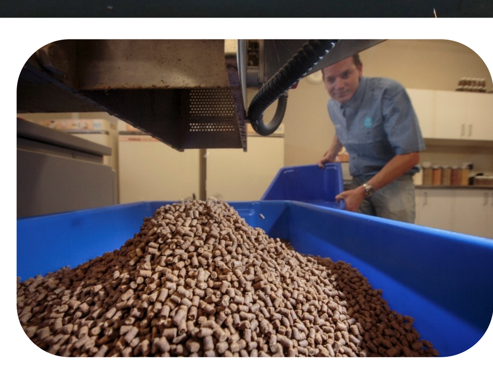
  Eco (n=6) commercial diet

  Propel-G (n=6) contains NovaqPro®

	Eco	Propel-G
FFIF (Forage Fish Inclusion Factor)	0.86	0.4
Composition (as is %)		
Moisture	8.5	8.6
Nitrogen (N)	6.4	5.9
Crude protein	40	37
Lipid	9.5	8
Ash	7.5	12
Phopshorus (P)	1.1	1.2
CHO	34.5	34.5
Energy	17.7	16.5
P:E	22.5	22.5

- Full commercial grow out cycle over 190-200 days to harvest
- Eco or Propel-G (contains NovaqPro®) fed from day 70
- Statistics: t-tests (P<0.05)

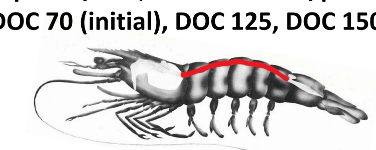
NUTRIENT RETENTION ANALYSIS
N and P retention,
4 ponds/diet
DOC 70-130 and
DOC 70-harvest



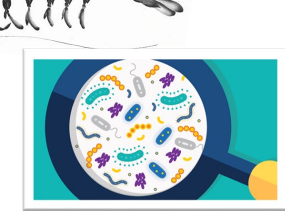
HEMOLYMPH ANALYSIS
BRIX refractometry DOC150
4 ponds/diet, 28-36 individuals/pond

Targeted proteomics (Sciex 6500 QTRAP MS), 50 peptides targeting 26 functional proteins[5], 4 ponds/diet, 5 pools/pond of 6-8 individuals

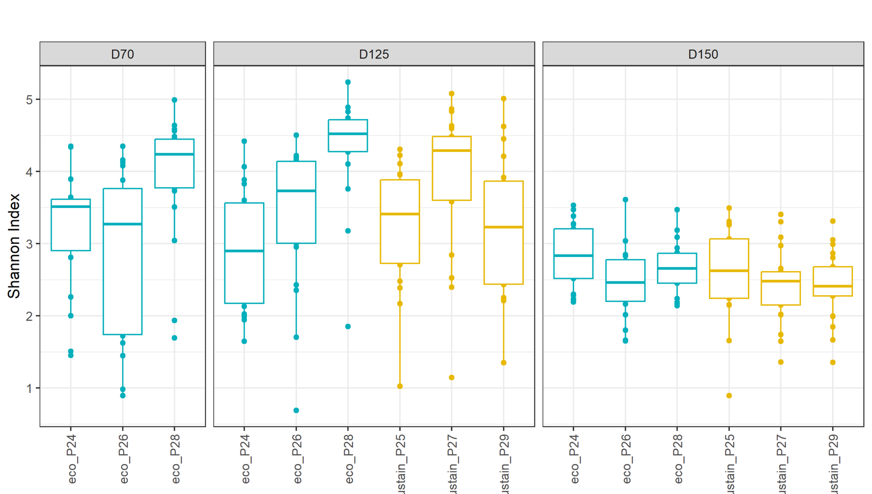
MICROBIOME ANALYSIS
16s V123 sequencing
3 ponds/diet, 19 individuals/pond
DOC 70 (initial), DOC 125, DOC 150



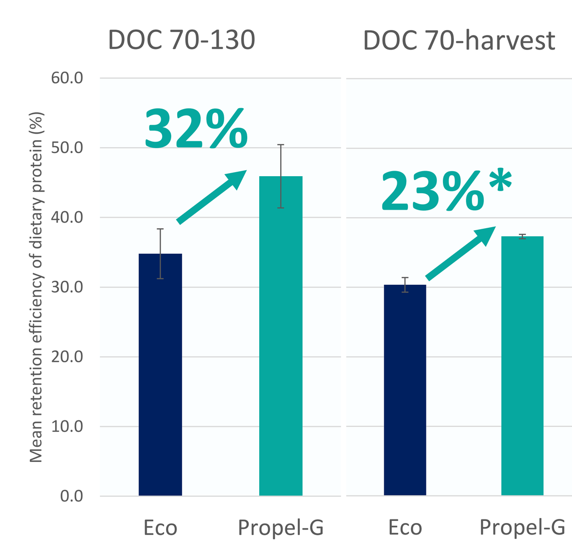
Tissue used - Intestine without digesta, frozen & RNALater preserved



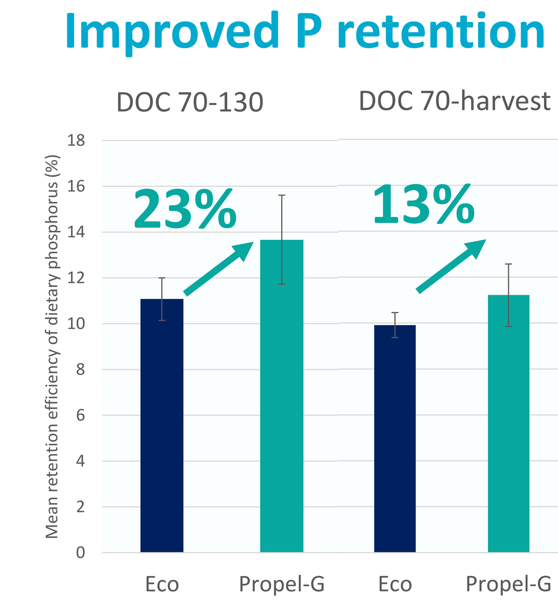
Species diversity (number and evenness) affected by diet and reduced towards end of crop



Improved N retention



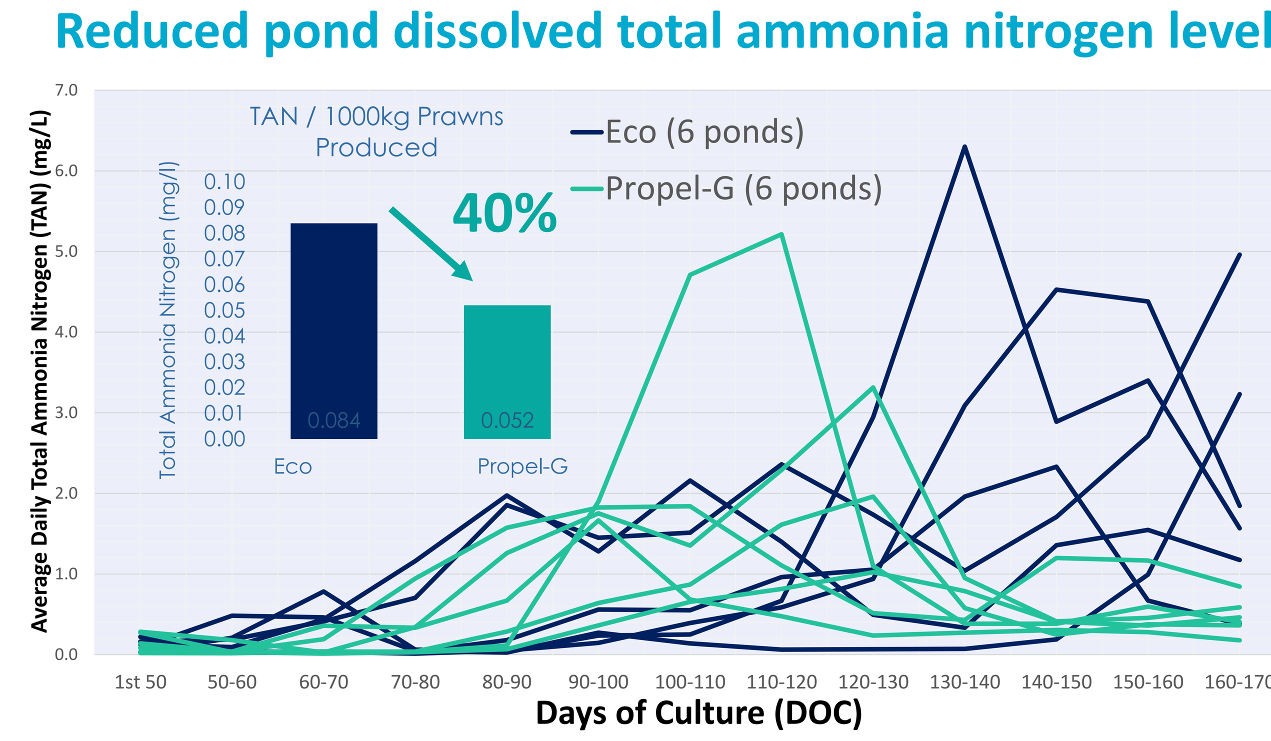
Improved P retention



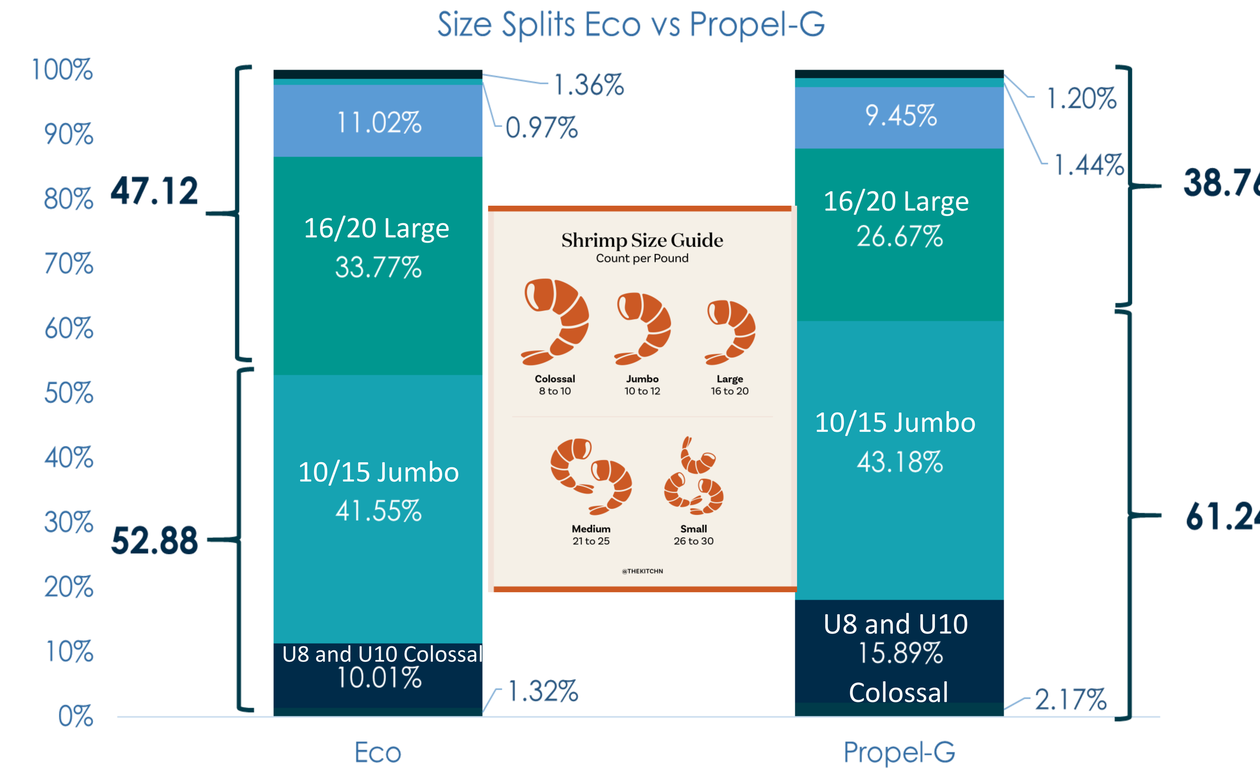
Improved survival, pond yield and feed conversion

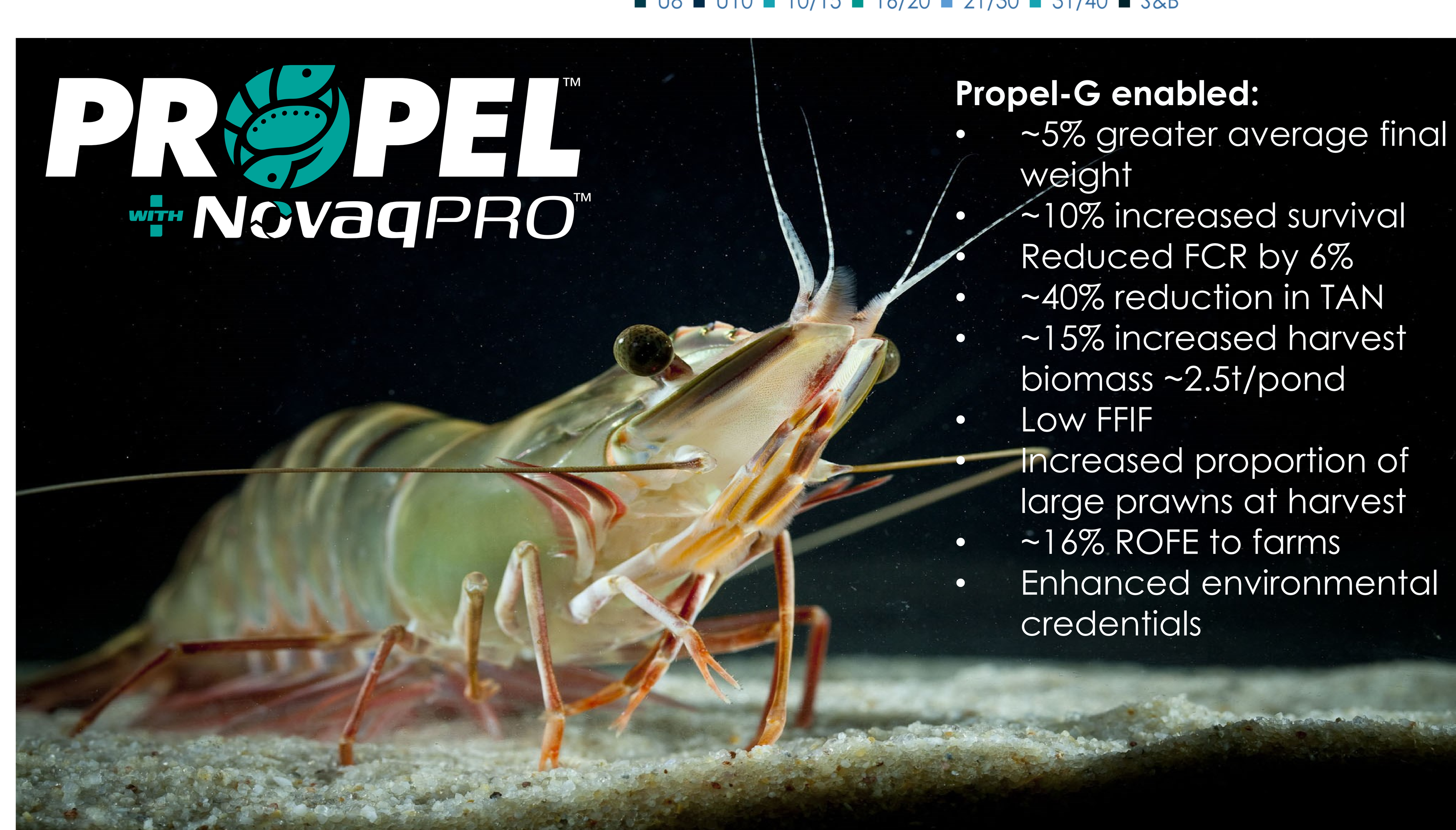
	ECO	PROPEL-G	% GAIN	Statistics
Average Harvest Weight (g)	30.0 ± 0.8	31.4 ± 0.8	4.7	nsd
Average Survival (%)	80.2 ± 5.2	88.2 ± 5.0	10.0	nsd
Average Pond Yield (kg)	16809 ± 1085	19320 ± 728	14.9	nsd
Average FCR	2.02 ± 0.04	1.89 ± 0.03	-6.1	P = 0.04
Total Ammonia Nitrogen (mg/L)	1.42 ± 0.22	1.00 ± 0.19	-29.0	nsd
BRIX (nutritional condition)	16.0 ± 0.8	17.7 ± 0.4	10.8	nsd

Reduced pond dissolved total ammonia nitrogen levels



Increased proportion of large sized prawns at harvest





Propel-G enabled:
- ~5% greater average final weight
- ~10% increased survival
- Reduced FCR by 6%
- ~40% reduction in TAN
- ~15% increased harvest biomass ~2.5t/pond
- Low FFIF
- Increased proportion of large prawns at harvest
- ~16% ROFE to farms
- Enhanced environmental credentials

Targeted quantification of 27 functional proteins:

- Antioxidant metabolism ↓
- Clotting factors ↓
- Digestive enzymes ↑
- Oxygen carrying capacity ↑
- Antimicrobial peptides ↑

References:

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FOR FURTHER INFORMATION
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PROPEL GOOD TO GROW

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