The search for a noble crayfish diet

Thomas Abeel, Jurgen Adriaen, Wouter Meeus, Ella Roelant, Stef Aerts
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  - Aquaculture in Belgium
  - Astaciculture: opportunities & challenges
- Feed trial
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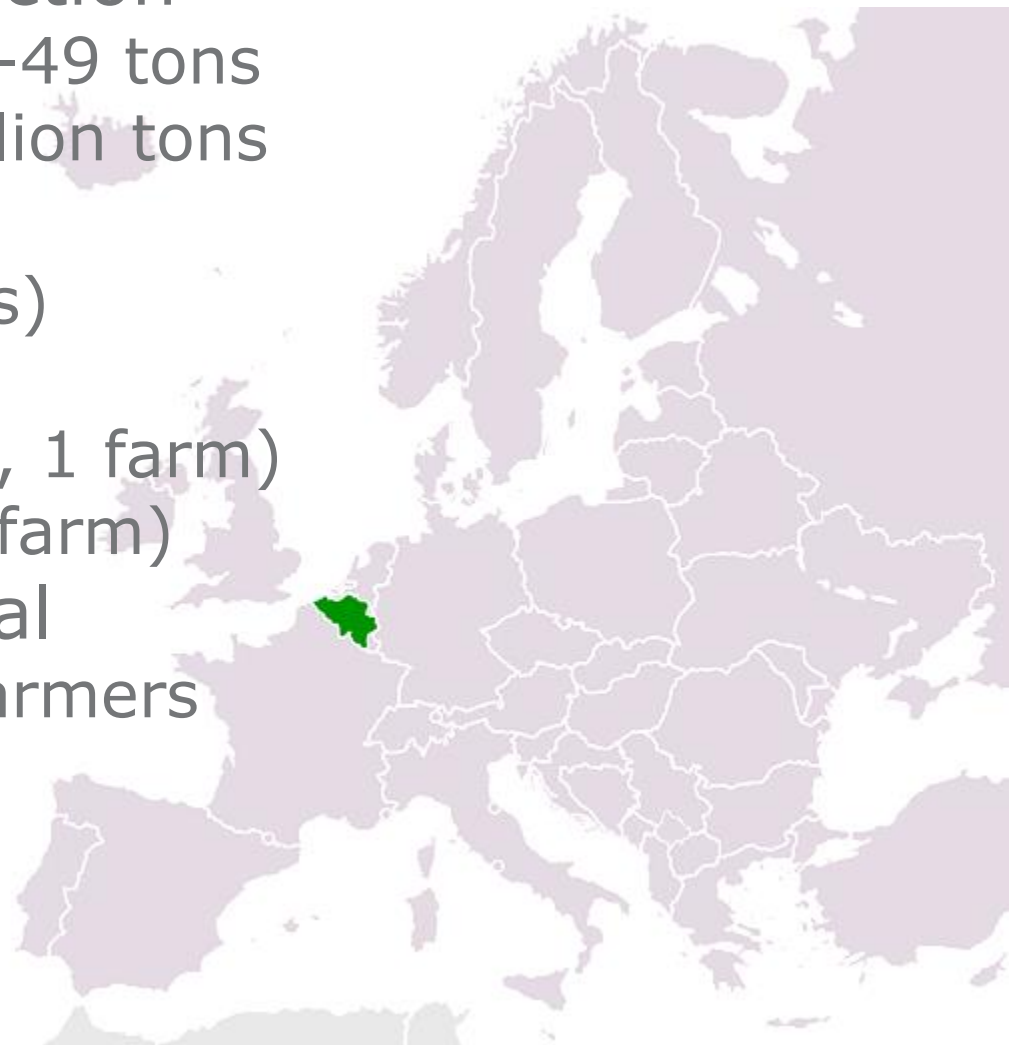
Aquaculture in Belgium

- No significant production
  - 2011: Belgium: 36-49 tons
    EU: 1.25 million tons
- Cultured species
  - Carp & eel (Flanders)
  - Trout (Wallonia)
  - Sturgeon (Turnhout, 1 farm)
  - Oysters (Ostend, 1 farm)
- Aquaculture potential
  - Diversification for farmers
  - RAS, Aquaponics



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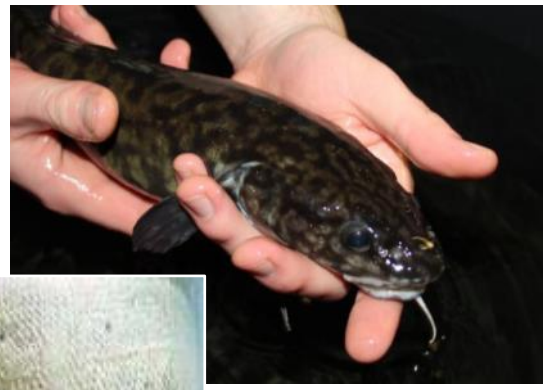
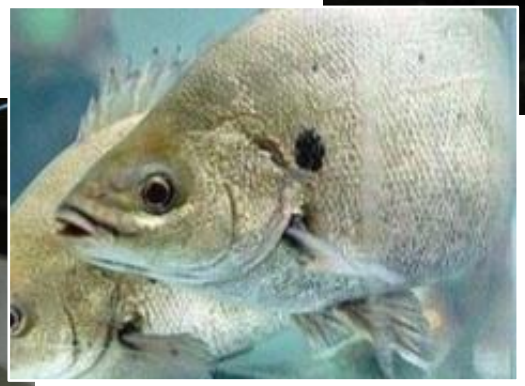
Aquaculture in Belgium

- Research on “new species”
  - Burbot
  - Omega perch
  - Noble crayfish
  - …





Aquaculture in Belgium

- Sustainable aquaculture species?
  - Indigenous/temperate
  - Low trophic level
  - High market value
  - Marketability

Opportunities for crayfish culture

- Sustainable aquaculture species?
  - Indigenous/temperate
    - Local product, less food miles
    - Low water temperature
  - Low trophic level
    - Polytrophic species
  - High market value
    - €25-45/kg
  - Marketability
    - Interest among top chefs
    - Culinary history

Challenges for crayfish culture

- Culture conditions/feeding
  - Majority of studies focus on juvenile culture
  - Crayfish older than 6 months?
- Reduce cannibalism
- Disease control

Feed trial

Objectives:

- find a basic diet for *A. astacus* culture
  - Practical (sinking, stability in water)
  - Existing commercial feed, readily available
  - Affordable price
- find a supplemental vegetable feed
  - Commonly available (at farms)
  - Sinking material
  - Low cost

Materials and methods

- Crayfish: 420 two-summer-old
  A.astacus (6,18±1,95g)
- System: 21 tanks (0,5m²), RAS
- Density: 40 crayfish/m²
- Shelter: Filtration bristles
- Temperature: 21°C (70°F)
- Duration: 83 days

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Materials and methods

Commercial pellets

- Shrimp feed
- Marine fish feed
- Carp feed

Materials and methods

Vegetable diets

- Alfalfa pellets
- Potato scrap
- Soy / rapeseed mixture
- Fodder beet tailings

Materials and methods

Nutritional analysis

	Shrimp	Marine	Carp	Alfalfa	Potato	Soy/ rapeseed	Beet
Crude protein (%)	34,64	52,00	35,60	16,22	1,65	41,27	1,17
Crude fat (%)	8,58	14,20	10,74	2,62	0,15	2,97	0,15
Carbohydrates (%)	36,62	16,69	32,92	34,37	24,57	28,41	6,28
Ash (%)	7,92	7,82	6,87	12,46	0,53	7,88	1,58
Crude fiber (%)	3,40	0,88	3,09	22,75	1,32	7,41	1,66
Moisture (%)	8,84	8,41	10,78	11,58	**71,78**	12,06	**89,16**

Results

- Feed had a significant effect on:
  - Growth (p=0.005)
  - Cheliped loss (p=0.028)
  - Survival rate (p=0.006)

Results

Commercial feeds

	Shrimp	Marine	Carp
SGR (%.day^{-1})	0.20±0.04	0.31±0.05	**0.34±0.03**
Chel. loss (%)	20.11±10.85	13.70±15.17	**6.93±8.07**
Survival rate (%)	91.67±10.41	**96.67±5.77**	**96.67±2.89**

(Mean value ± st. dev.)

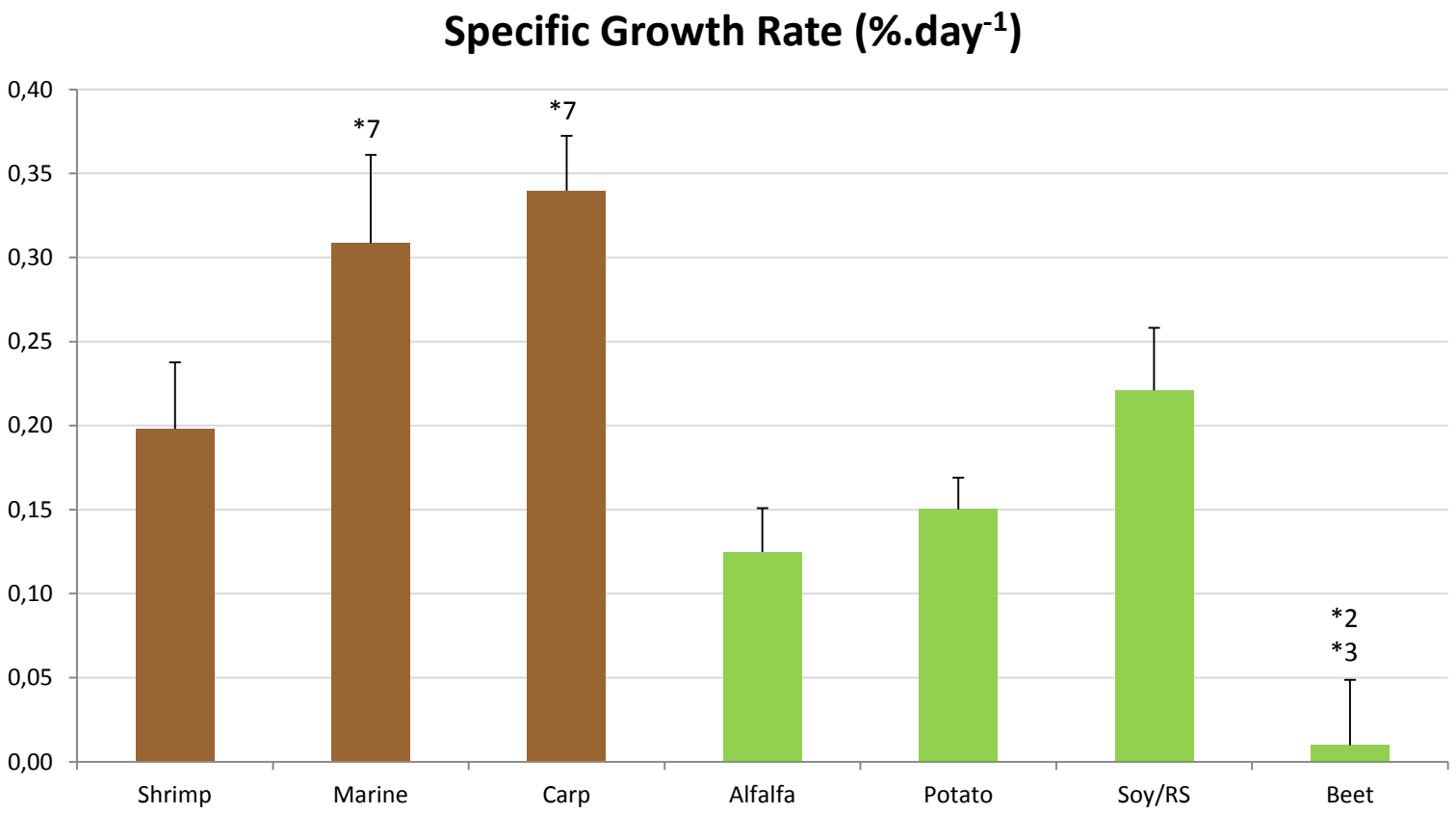
Results

Vegetable feeds

	Alfalfa	Potato	Soy/ Rapeseed	Beet
SGR (%.day^{-1})	0.12±0.03	0.15±0.02	**0.22±0.04**	0.01±0.04
Chel. Loss (%)	27.94±13.03	33.43±7.67	**9.26±8.49**	**8.70±4.85**
Survival rate (%)	80.00±10.00	80.00±5.00	**85.00±8.66**	80.00±10.00

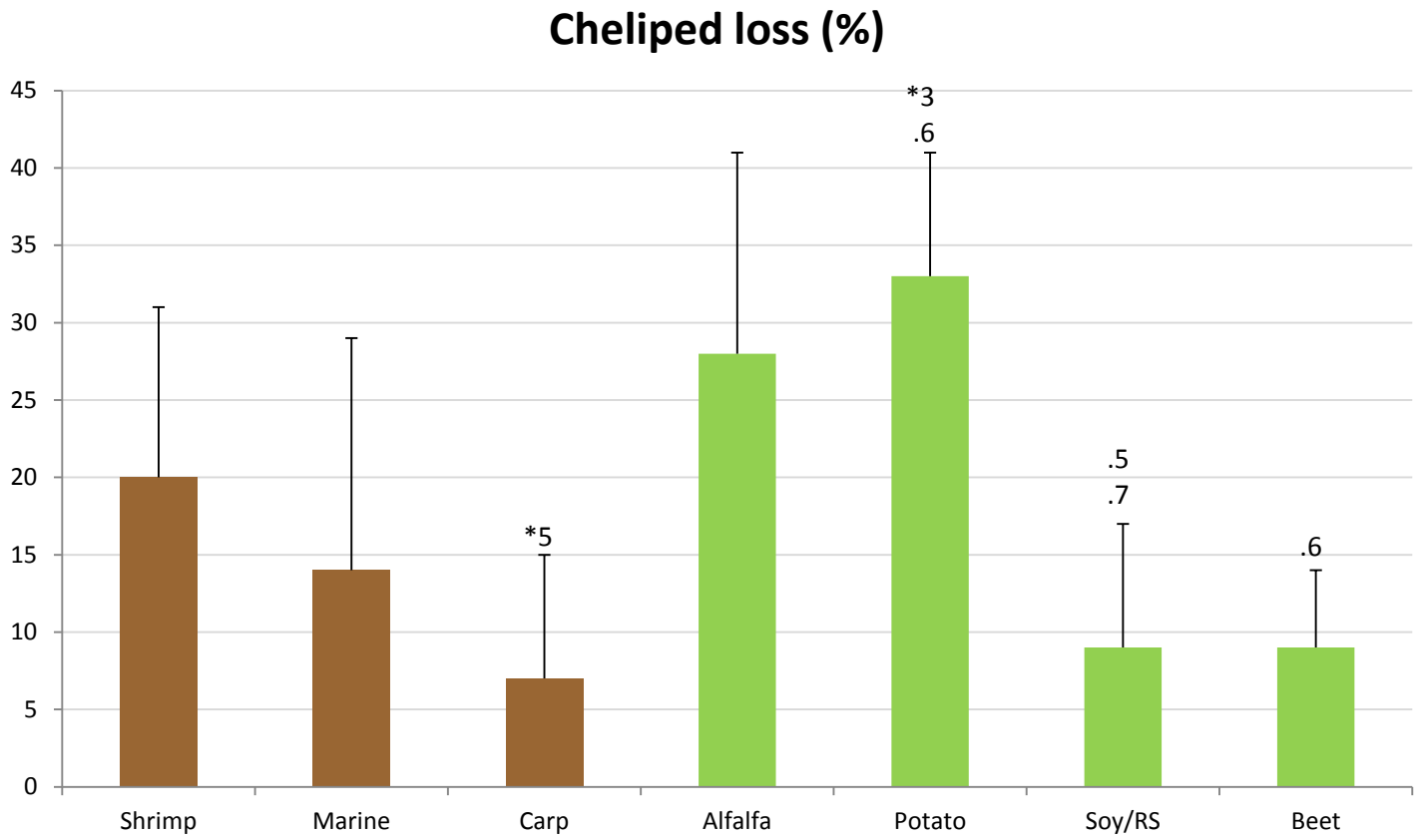
(Mean value ± st. dev.)

Results



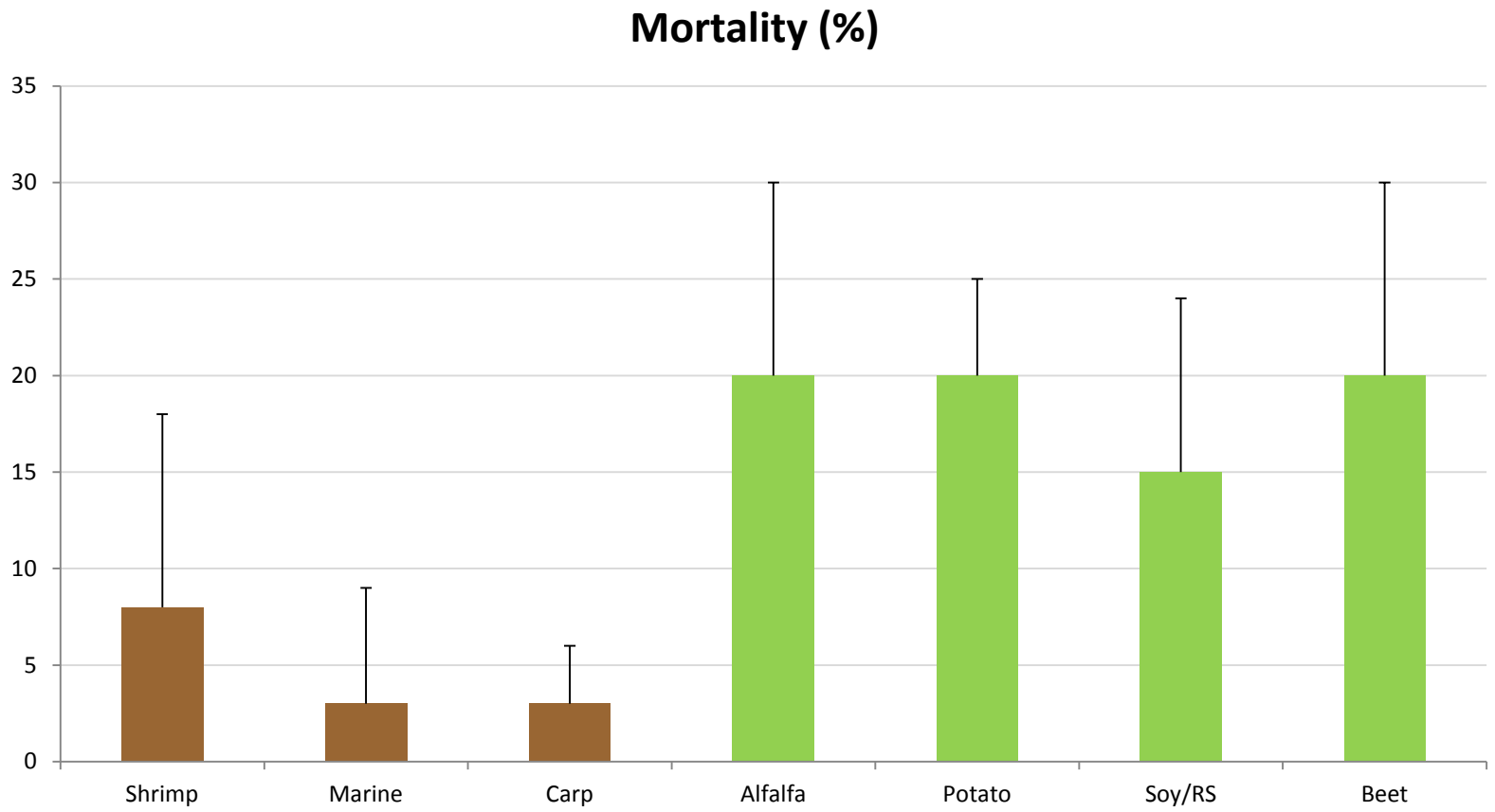
* significant ($p < 0.05$)

Results



* significant ($p < 0.05$)
. tendency ($p < 0.10$)

Results


Mortality (%)
35
30
25
20
15
10
5
0
Shrimp
Marine
Carp
Alfalfa
Potato
Soy/RS
Beet

Discussion

- Carp & marine fish feed
  → best performance
- Vegetable feeds:
  - High mortality
  - Soy/rapeseed: acceptable growth

Conclusion

Feed prices

	Price/kg	
Marine	€ 2,18	¥ 298,78
Shrimp	€ 1,50	¥ 205,58
Carp	€ 1,20	¥ 164,46
Soy/rapeseed	€ 0,40	¥ 54,82
Potato	€ 0,05	¥ 6,85
Beet	€ 0,03	¥ 4,11
Alfalfa	€ 0,48	¥ 65,79

Conclusion

- Carp feed advantages:
  - Economic: relatively low price
  - Ecologic: low fishmeal content (10% vs. 60% in Marine feed)
  - Production:
    - High survival rates
    - High growth
    - Less cheliped loss/aggressive behaviour

Conclusion

- Vegetable feeds
  - Avoid high moisture content in fresh feeds
  - Preferable high protein content
  - Limited ash/fibre content
- Combination comm. + veg. feed ?
  - → lower feeding costs
  - → sustainability


Thank you for your attention!