

Inclusion of starfish as ingredient of fish meal

Ministry of Environment and Food

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Problem

- Starfish are an unexploited natural protein resource
- Starfish can be used in animal feed as "starfish meal" \approx fishmeal
- Starfish belong to the Phylum Echinodermata
- Starfish cannot be an ingredient in fishmeal
 - Echinodermata is not included in the definition of "Aquatic animals"

Definition of fish meal

- Commission Regulation (EU) No 142/2011, Annex I:
 - 7. '**fishmeal**' means processed animal protein derived from aquatic animals, except sea mammals;
- Regulation (EC) No 1069/2009, Article 3:
 - 9. '**aquatic animals**' means aquatic animals as defined in Article 3(1)(e) of Directive 2006/88/EC;
- Council Directive 2006/88/EC, Article 3:
 - (e) 'aquatic animal' means:
 - (i) fish belonging to the superclass Agnatha and to the classes Chondrichthyes and Osteichthyes;
 - (ii) mollusc belonging to the Phylum Mollusca;
 - (iii) crustacean belonging to the Subphylum Crustacea;
- TSE Regulation (EC) No 2001/999 refers to Council Directive 2006/88/EC

Solution

Animal by-product rules

- Commission Regulation (EU) No 142/2011, Annex I is proposed amended by SANTE/7110/2015:
 - 7. '**fishmeal**' means processed animal protein derived from aquatic animals and echinoderms and tunicates, except sea or freshwater mammals;

TSE regulation

- Regulation (EU) No 999/2001, Annex IV, Chapter IV, Section A (a) is proposed amended:
 - (a) the fishmeal must be produced in processing plants dedicated exclusively to the production of fishmeal ~~products derived from aquatic animals except sea mammals~~
- Regulation (EU) No 999/2001, Annex IV, Chapter IV, Section E (a) is proposed amended:
 - (a) the fishmeal used in milk replacers shall be produced in processing plants dedicated exclusively to the production of fishmeal ~~products derived from aquatic animals except sea mammals~~ and shall comply.....
- As a consequence Regulation (EU) No 999/2001, Annex I, 1 (e) "Directive 2006/88/EC": (ii) "~~aquatic animal in Article 3(1)(e)~~" is proposed deleted

Starfish problem in the Limfjorden

- Common starfish *Asterias rubens*
- >50 starfish m⁻² in some parts of the Limfjord
- Fierce and fast predation on bottom culture mussel beds (depletion within days/weeks)
- Future of the Limfjorden mussel industry is at risk



Mussel production in the Limfjord



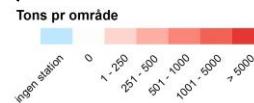
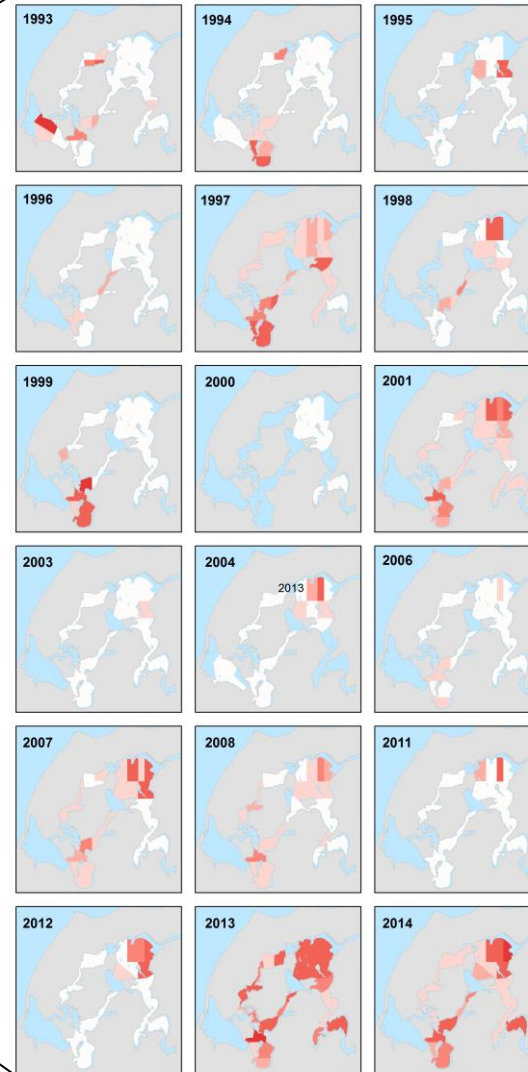
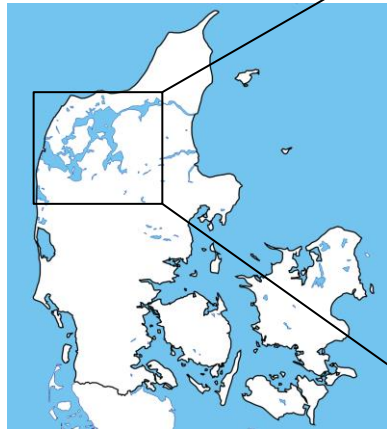
Starfish by-products management: Fishing gear



Targeted fishery using a specifically designed environmentally friendly starfish beam trawl



Starfish population in the Limfjorden



Estimated biomass 2013/14: 100-300,000 t

From pest to profit



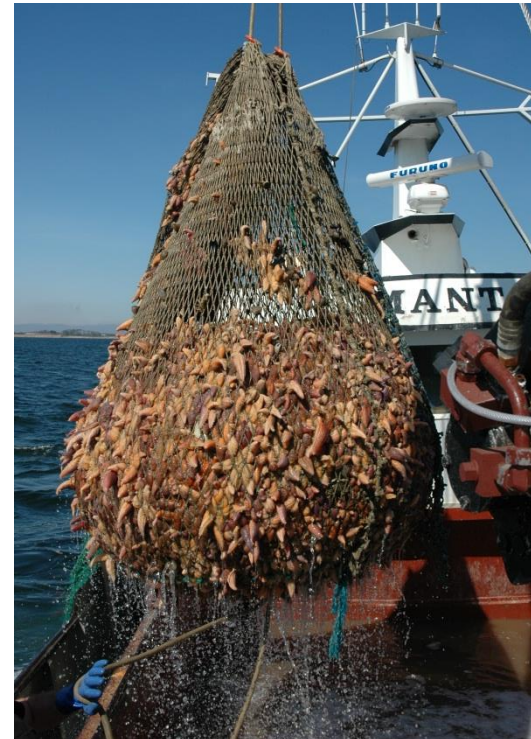
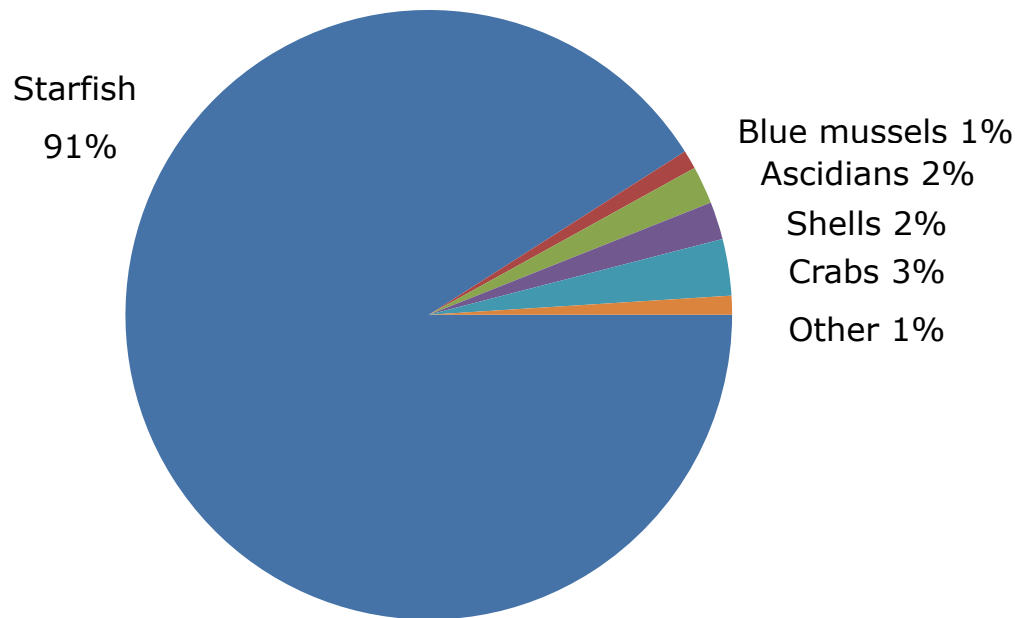
Starfish fishery - a possible solution?



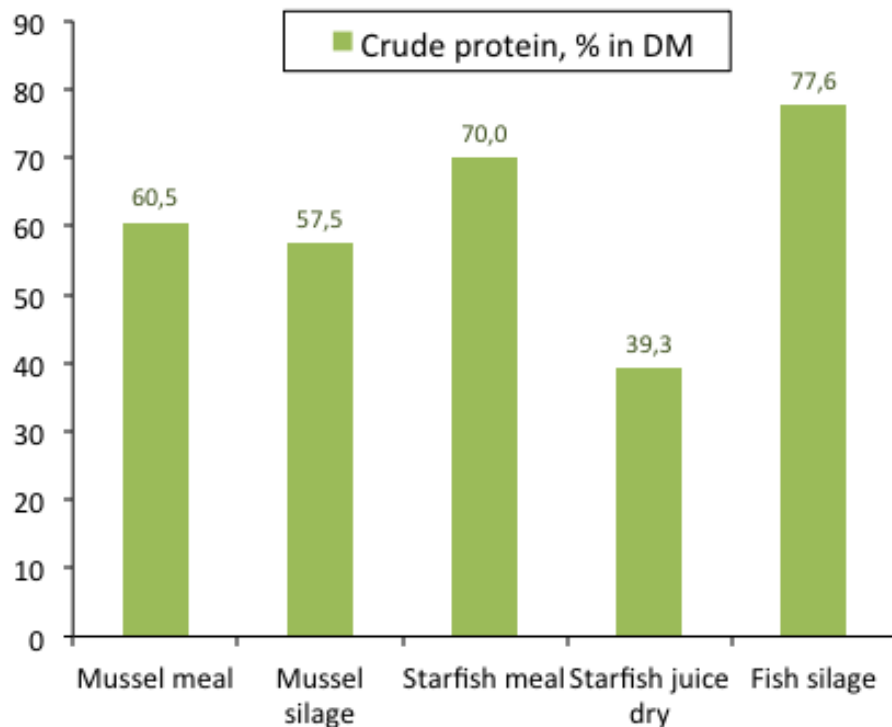
- Remove starfish as a threat to the mussel industry
- Reduce predation pressure on bottom mussels
- Starfish can be used for something useful, e.g. feed
- From pest to profit – win-win situation

Bycatch in the starfish fishery

- Trawl effective at targeting starfish: typical commercial haul shows minimal by-catch



Nutritional value of starfish



- Starfish meal contains up to 70% raw protein: exceeds protein content of mussels & seaweed
- Better amino acid composition than vegetable alternatives
- Heat treatment reduces unwanted bacteria and gives shelf life of approx. 1 year
- Digestibility trials in pigs show good assimilation of product containing starfish meal



Potential for use of starfish meal

- A catch of 10,000 t would remove approximately 165 t Nitrogen and 15 t Phosphorous from coastal areas
- Reduced N losses in organic livestock production
- 10,000 t catch → approx. 2,500 t meal → turnover of 4.5 million DKK (600,000 €)
- Job creation in remote areas
- Great interest from meal manufacturing and animal husbandry industries





Thank you for your attention

