

Modelling gastric evacuation in gadoids feeding on crustaceans - DTU Orbit (08/11/2017)

Modelling gastric evacuation in gadoids feeding on crustaceans

A mechanistic, prey surface-dependent model was expanded to describe the course and rate of gastric evacuation in predatory fishes feeding on crustacean prey with robust exoskeletons. This was accomplished by adding a layer of higher resistance to the digestive processes outside the inner softer parts of a prey cylinder abstraction and splitting up the prey evacuation into two stages: an initial stage where the exoskeleton is cracked and a second where the prey remains are digested and evacuated. The model was parameterized for crustaceans with different levels of armour fed to Atlantic cod *Gadus morhua* or whiting *Merlangius merlangus* and recovered from the stomachs at different post-prandial times. The prey species were krill *Meganyctiphanes norvegica*; shrimps and prawns *Crangon crangon*, *Pandalus borealis*, *Pandalus montagui* and *Eualus macilentus*; crabs *Liocarcinus depurator* and *Chionoecetes opilio*. In accordance with the apparent intraspecific isometric relationship between exoskeleton mass and total body mass, the model described stage duration and rate of evacuation of the crustacean prey independently of meal and prey sizes. The duration of the first stage increased (0-33 h) and the evacuation rate of both stages decreased (by a half) with increasing level of the crustacean armament in terms of chitin and ash. A common, interspecific parameterization of the model within each of the categories krill, shrimp and crab can probably be used if the contents of chitin and ash are similar among prey species per prey category. The model offers a simple way for estimating evacuation rates from stomach content data in order to obtain food consumption rates of wild fishes, provided that information about digestion stage of crustacean prey is available. © 2016 The Fisheries Society of the British Isle

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