Ute Daewel (Atlantic Cod)

This model has been applied to estimate survival of Atlantic cod (*Gadus Morhua*) larvae in the North Sea. To provide zooplankton prey for larvae a bulk zooplankton biomass from an NPZD model (ECOSMO) was converted into a prey size spectrum using methods described by Daewel et al. (2008*b*). The physiological model of cod larvae used a mechanistic approach to restrict an upper limit of daily food consumption and prevent larval overfeeding. The maximum gut content (GCmax) and gut evacuation rate (GER) determined ingestible amount of prey at the model time step. The encounter rate of larvae with their prey depends not only on larval reactive distance and prey density, but also on larval swimming behavior and turbulence. Cod larvae were considered pause–travel predators, searching for prey during pauses between swimming events. (MacKenzie and Kurobe 1995). modelled eggs, yolk sac and feeding larvae were between 5.5- 20 mm length. They included starvation criteria in their model by considering critical minimum mass.

Ute Daewel (Sprat)

This model has been applied to simulate growth and survival of European sprat (*Sprattus sprattus*) larvae in the North Sea. To provide zooplankton prey for larvae a bulk zooplankton biomass from an NPZD model (ECOSMO) was converted into a prey size spectrum using methods described by Daewel et al. (2008*b*).

In the physiological model of sprat larvae, the daily food consumption was restricted to an upper limit (Cmax), to prevent overfeeding (e.g., Letcher et al. 1996). Maximum consumption (Cmax) in sprat was based on an empirically derived formulation (for details see Daewel et al. 2008*a*). The encounter rate of larvae with their prey depends not only on larval reactive distance and prey density, but also on larval swimming behavior and turbulence. A cruise predator formulation for sprat larvae was used (see Daewel et al. 2008*b* for details). modelled eggs, yolk sac and feeding larvae were between 5.5- 20 mm length. They included starvation criteria in their model by considering larval condition factor < 0.4.

New:

Ute (cod)

This model has been developed to estimate the survival of Atlantic cod (Gadus Morhua) larvae in the North Sea. To provide zooplankton prey for the larvae, a bulk zooplankton biomass from an NPZD model (ECOSMO) was converted into a prey size spectrum using the methods described by Daewel et al. (2008b). The physiological model of the cod larvae used a mechanistic approach to restrict the upper limit of daily food consumption and prevent larval overfeeding, with the maximum gut content (GCmax) and gut evacuation rate (GER) determining the ingestible prey amount at each model time step. The encounter rate of larvae with their prey depends not only on larval reactive distance and prey density, but also on larval swimming behavior and turbulence. The cod larvae were considered pause-travel predators, searching for prey during pauses between swimming events, as reported by MacKenzie and Kurobe in 1995. The modelled eggs, yolk sac, and feeding larvae range in size from 5.5-20 mm, and starvation criteria are incorporated by considering the critical minimum mass, providing valuable insights into the complex dynamics of cod larvae and their prey in the North Sea.

Ute (sprat)

This model has been developed to simulate the growth and survival of European sprat (Sprattus sprattus) larvae in the North Sea. To provide zooplankton prey for the larvae, a bulk zooplankton biomass from an NPZD model (ECOSMO) was transformed into a prey size spectrum using the methods outlined by Daewel et al. (2008b). In the physiological model of sprat larvae, the daily food consumption was limited to an upper threshold (Cmax) to prevent overfeeding, as demonstrated in previous research (e.g., Letcher et al. 1996). The Cmax in sprat was derived from an empirical formula (for more information, see Daewel et al. 2008a). The encounter rate of larvae with their prey is influenced by factors such as larval reactive distance, prey density, swimming behavior, and turbulence. A cruise predator formulation was utilized for sprat larvae (details provided in Daewel et al. 2008b). The modelled eggs, yolk sac, and feeding larvae ranged in size from 5.5-20 mm, and the model included starvation criteria by considering the larval condition factor < 0.4. This model provides valuable insights into the complex dynamics of sprat larvae and their prey in the North Sea.