**Title:**

Rates and patterns of pleopod loss in snow crab (*Chionoecetes opilio*)

**Summary**

Crustaceans may lose their pleopods (i.e. walking legs or chelipeds) due to predation, competition or handling during fishing. Missing pleopod patterns were analyzed using survey data from a population of snow crab (*Chionoecetes opilio*) in the southern Gulf of Saint Lawrence. Pleopod loss rates were regressed over sex, maturity stage and size of the animal, as well as the condition of its carapace. Spatio-temporal variation was also considered.

Large differences were found between the sexes. Whereas rates for immature male crab were generally low and constant over all sizes, they were found to be two to three times higher in sexually mature versus immature male crab. This pattern is even apparent in newly moulted crab, with crab which had moulted in previous years showing only a moderate increase in pleopod loss. In addition, the loss rates were twice as high in smaller mature males than for larger ones. Such results strongly hint at mating competition as the main mechanism for pleopod loss.

Pleopod loss rates in females were about 60% those observed in males. Mature females similarly showed higher rates than immature ones, with newly moulted females having a moderate increase in pleopod rates than older mature females. This may be a function of the longer life expectancy of mature female versus male snow crab. Rates for females showed little variation with size.

In males the 2nd pleopods had the highest loss rates whereas the chelipeds and 5th pleopods had the lowest. In females, the 2nd and 5th pleopods had the highest rates whereas the chelipeds had a rate less than half that of any other pleopod.

Annual changes in the pleopod rates show some correlation with underlying population dynamics, most notably high abundance levels in large males. Results suggest that intra-specific competition between crab may be the main drivers in the patterns observed.

**Data sampling:**

* Missing crab walking legs and chelipeds were noted for all crab, for most years.
* In some years, crab smaller than 40 mm CW were not sampled for missing legs.
* Only legs which were naturally lost were considered in the following analyses.
* Regenerated legs, representing legs which were lost in previous moults, were also not considered in the analyses.

**Factors considered:**

* Leg loss may occur by a number of factors:
  + Moulting
  + Predation
  + Competition
* Observed factors were
  + Morphometric maturity
  + Carapace condition
  + Parity (crab side)
  + Carapace width (mm)
  + Location (spatial factor)