

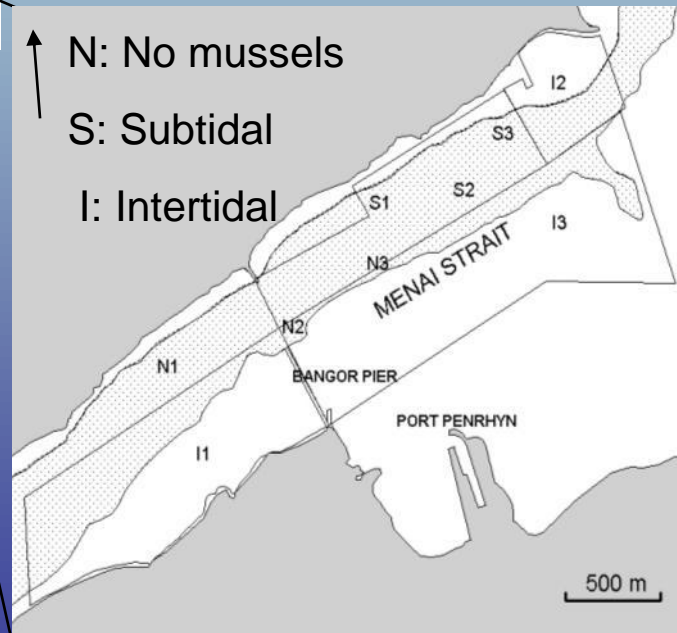
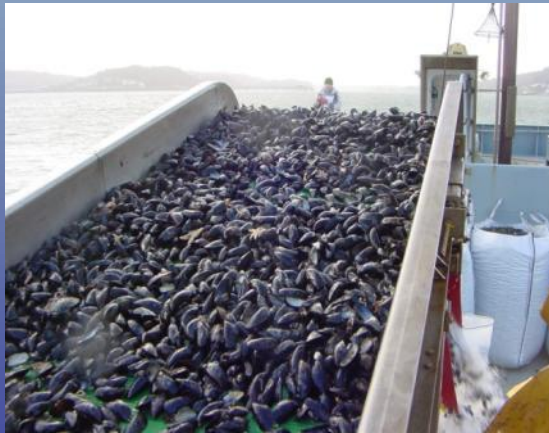


# Effects of temperature, feeding rates and day length on *Carcinus maenas* abundance and catch per unit effort

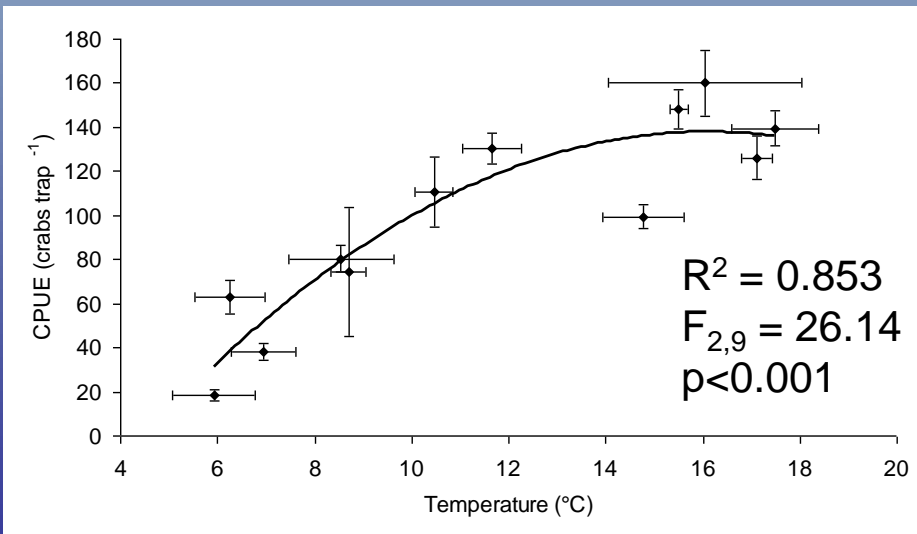
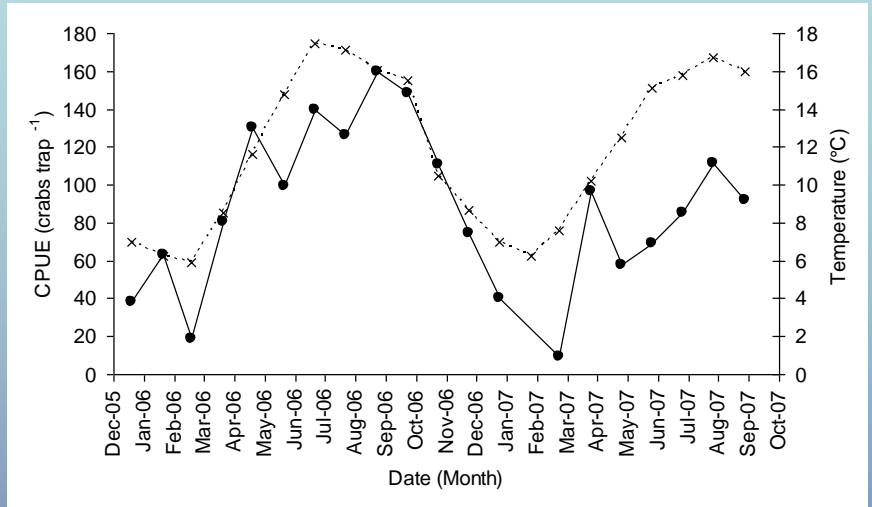


Lee Murray  
and Ray Seed

# Study sites



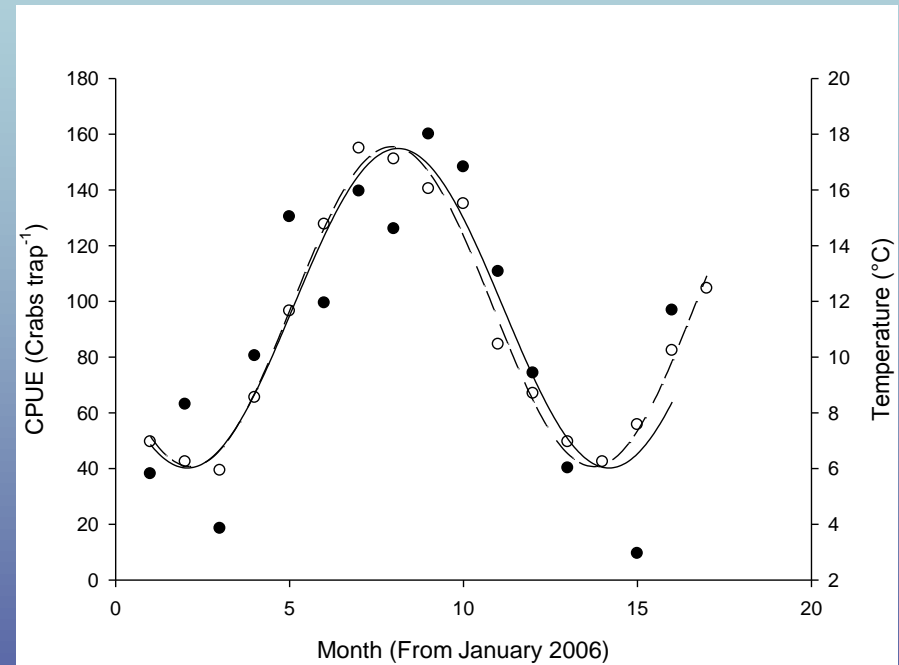
# Temperature and CPUE



# Temperature and CPUE

- Welch (1968)
- Atkinson & Parsons (1973)
- Dare & Edwards (1976)

$$y = y_0 + a \sin\left(\frac{2\pi x}{b} + c\right)$$



Temperature:

$$R^2 = 0.984, F_{3,13} = 258.635, p < 0.0001$$

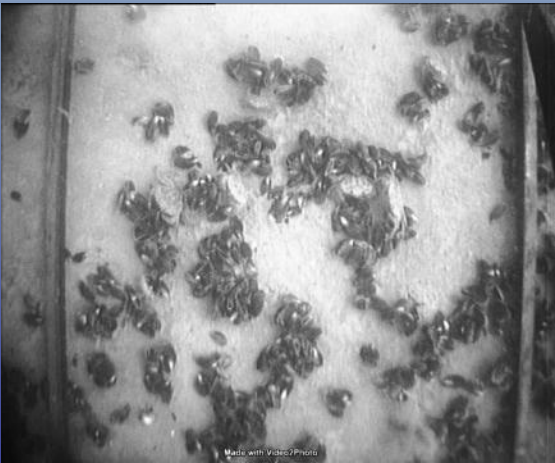
CPUE:

$$R^2 = 0.771, F_{3,11} = 12.3412, p = 0.0008$$

# Crab abundance

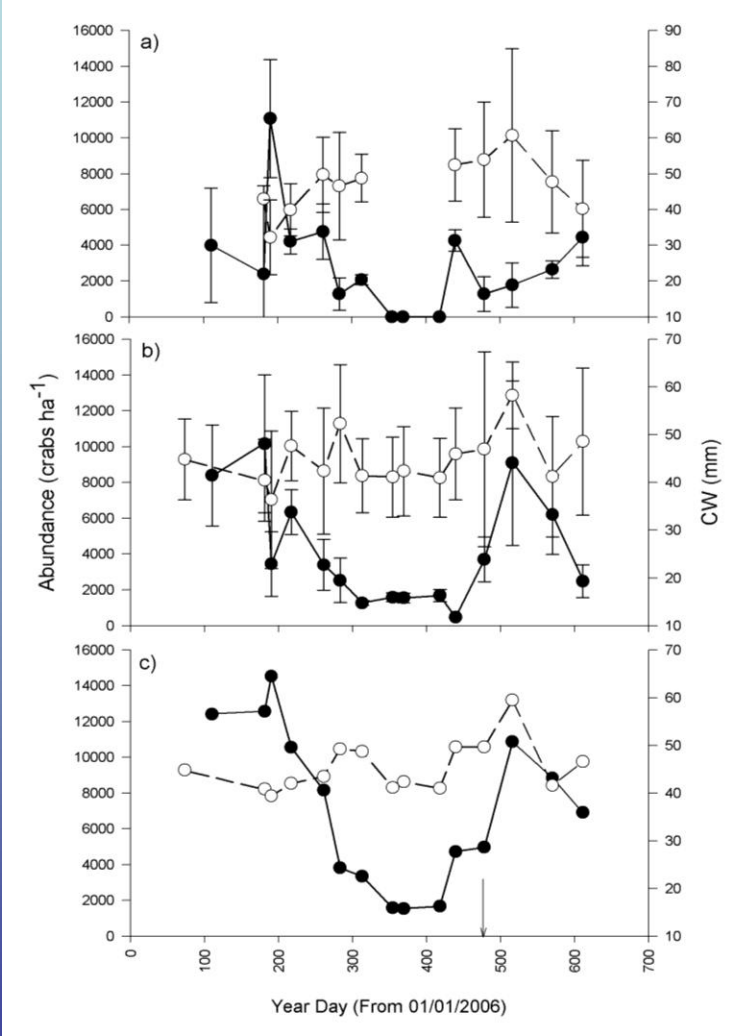


Intertidal

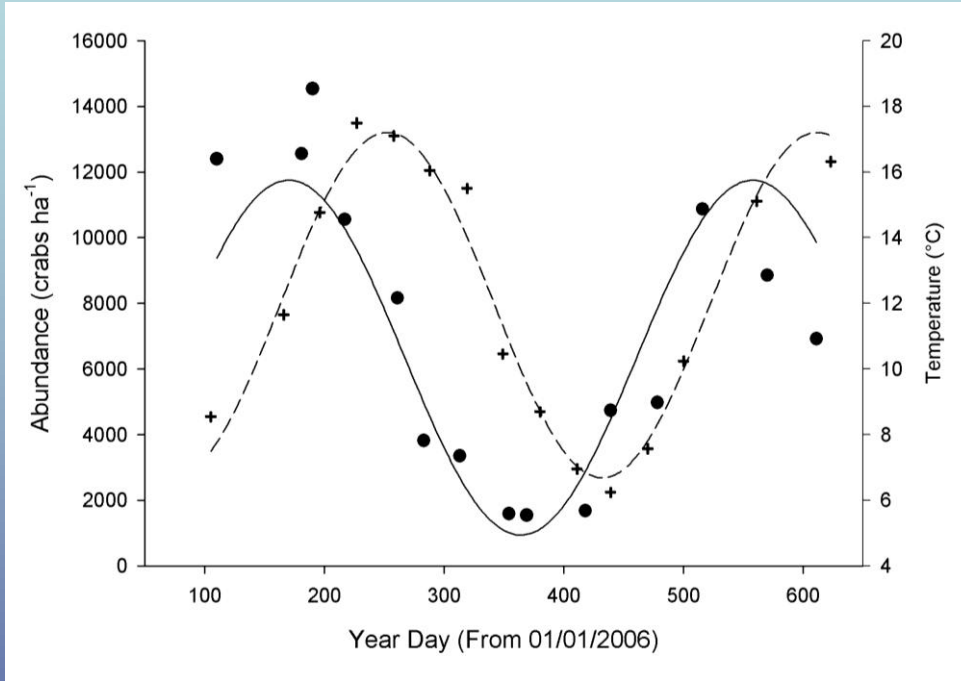


Subtidal

Total



# Temperature and abundance

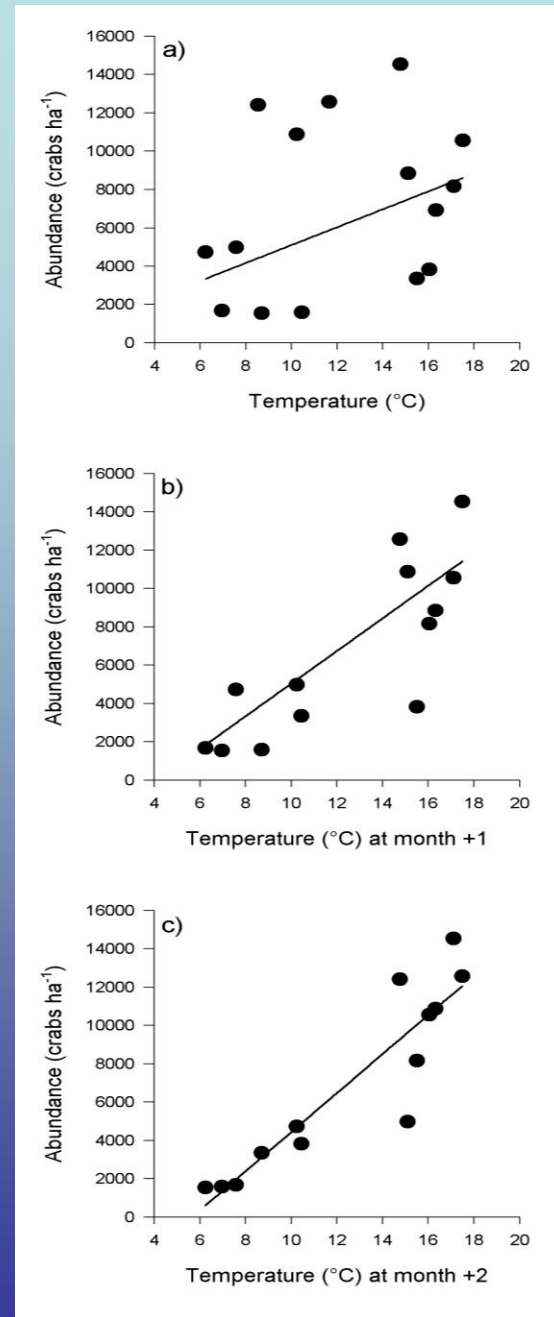


Temperature:

$$R^2 = 0.973, F_{3,11} = 133.184, p < 0.0001$$

Abundance:

$$R^2 = 0.815, F_{3,11} = 16.201, p = 0.0002$$



$$R^2 = 0.229$$

$$F_{1,11} = 3.2635$$

$$p = 0.098$$

$$R^2 = 0.679$$

$$F_{1,11} = 23.305$$

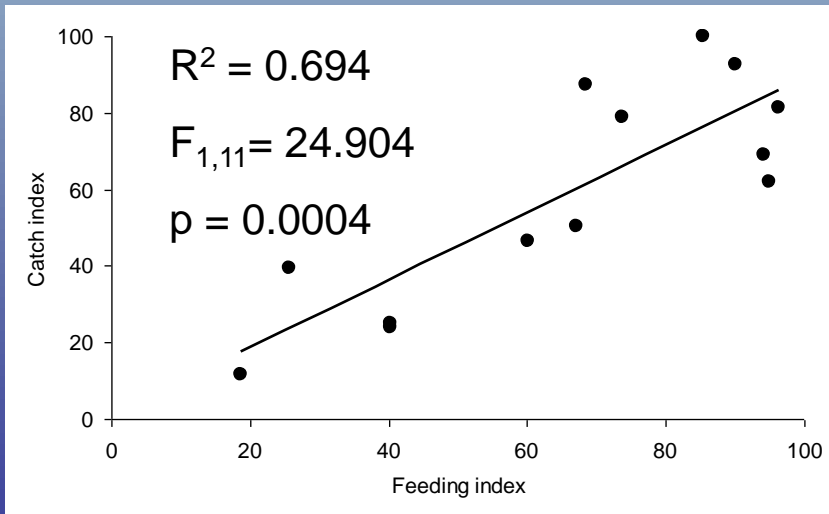
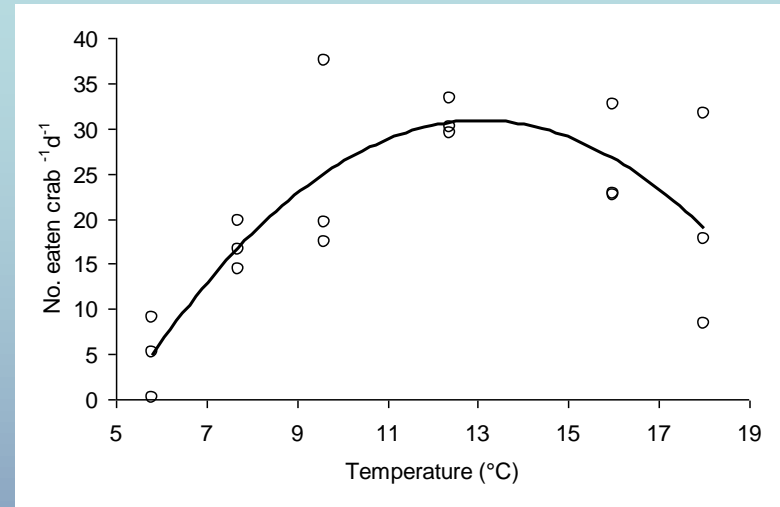
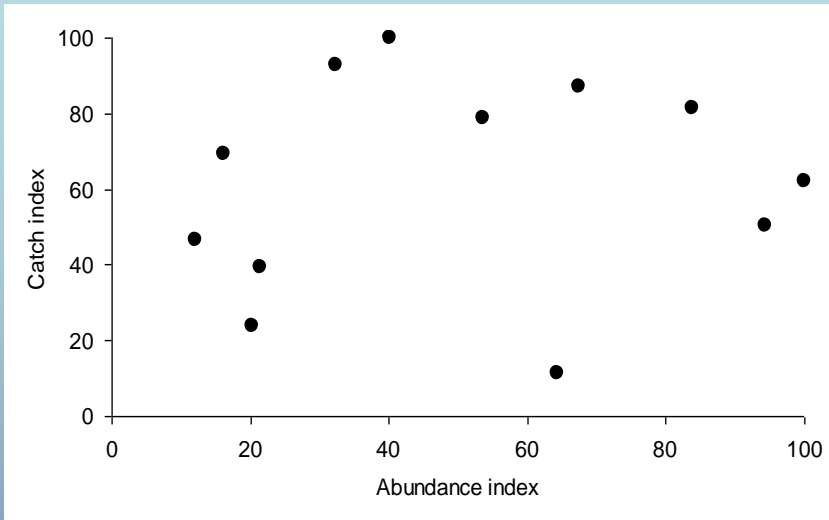
$$p = 0.0005$$

$$R^2 = 0.828$$

$$F_{1,11} = 53.101$$

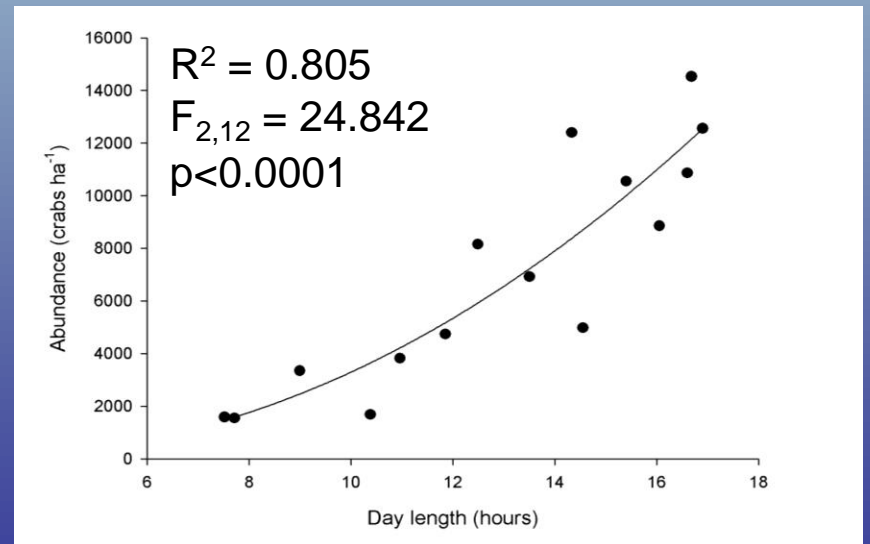
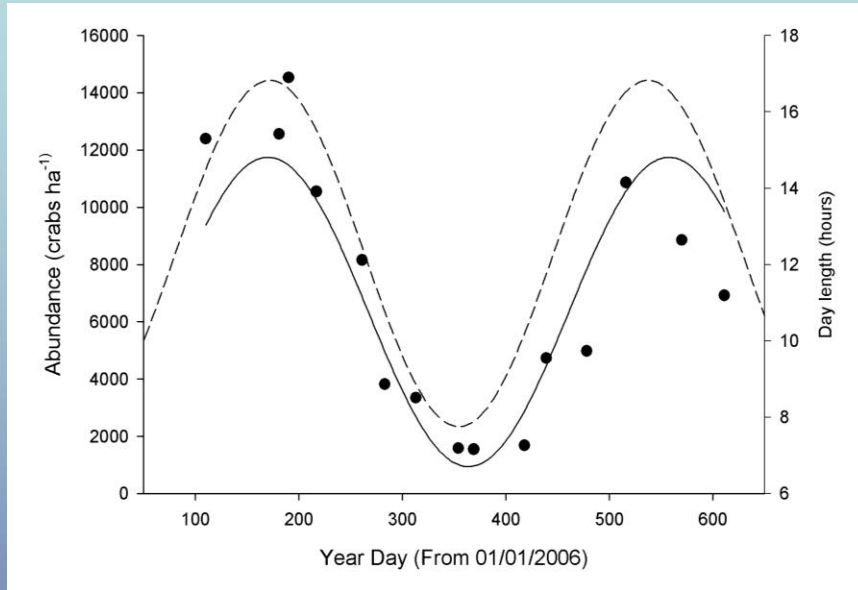
$$p < 0.0001$$

# Temperature and feeding rates



- Wallace (1973)
- Elner (1980)
- Robertson *et al.* (2002)

# Day length and abundance





# Conclusions

- Catches in baited traps do not just reflect abundance
- Studies which have used baited traps to estimate abundance may need to be reassessed
- 69% of variation in CPUE is due to temperature dependent feeding rates
- Day length, not temperature, is arguably the most likely cue for crabs to migrate
- CPUE is useful in determining levels of predation
- The relationship between metabolism and feeding rates requires further study

# References

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