Supplementary material for Garzke et al manuscript. This file includes analyses and model outputs supporting zooplankton results in main text.

Zooplankton analysis

Abundance data over whole experiment

```
## Linear mixed model fit by REML ['lmerMod']
## Formula: Nt ~ invTT + trophic.level + (1 | Tank)
##    Data: data.N
##
## REML criterion at convergence: 1040.4
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -1.0549 -0.5560 -0.3982  0.3415  4.1334
##
## Random effects:
##  Groups   Name        Variance Std.Dev.
##  Tank     (Intercept)   4.531   2.129
##  Residual             386.500  19.660
## Number of obs: 120, groups:  Tank, 20
##
## Fixed effects:
##                   Estimate Std. Error t value
## (Intercept)      -575.747    290.236  -1.984
## invTT              15.019      7.375   2.037
## trophic.levelPZN   -5.973      3.725  -1.603
##
## Correlation of Fixed Effects:
##             (Intr) invTT
## invTT       -1.000
## trphc.lvPZN  0.073 -0.080
```

```
##
##  Shapiro-Wilk normality test
##
## data:  resid(m2)
## W = 0.77499, p-value = 2.801e-12
```

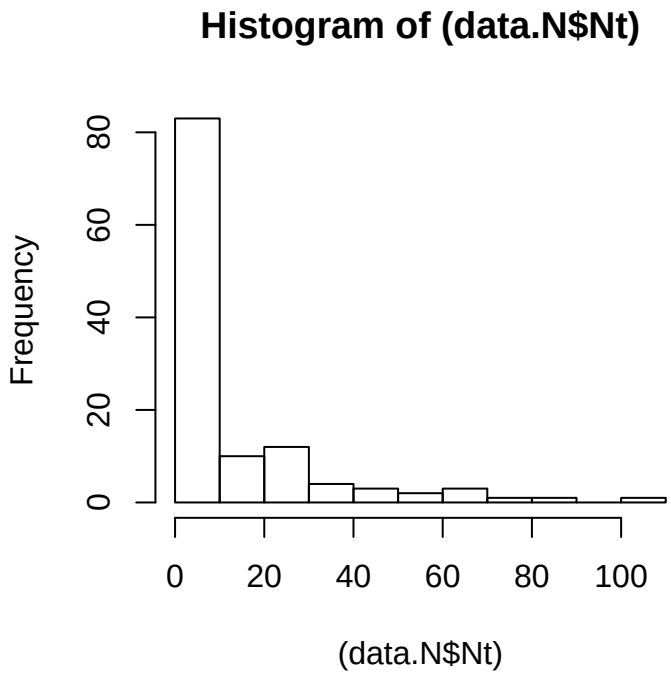
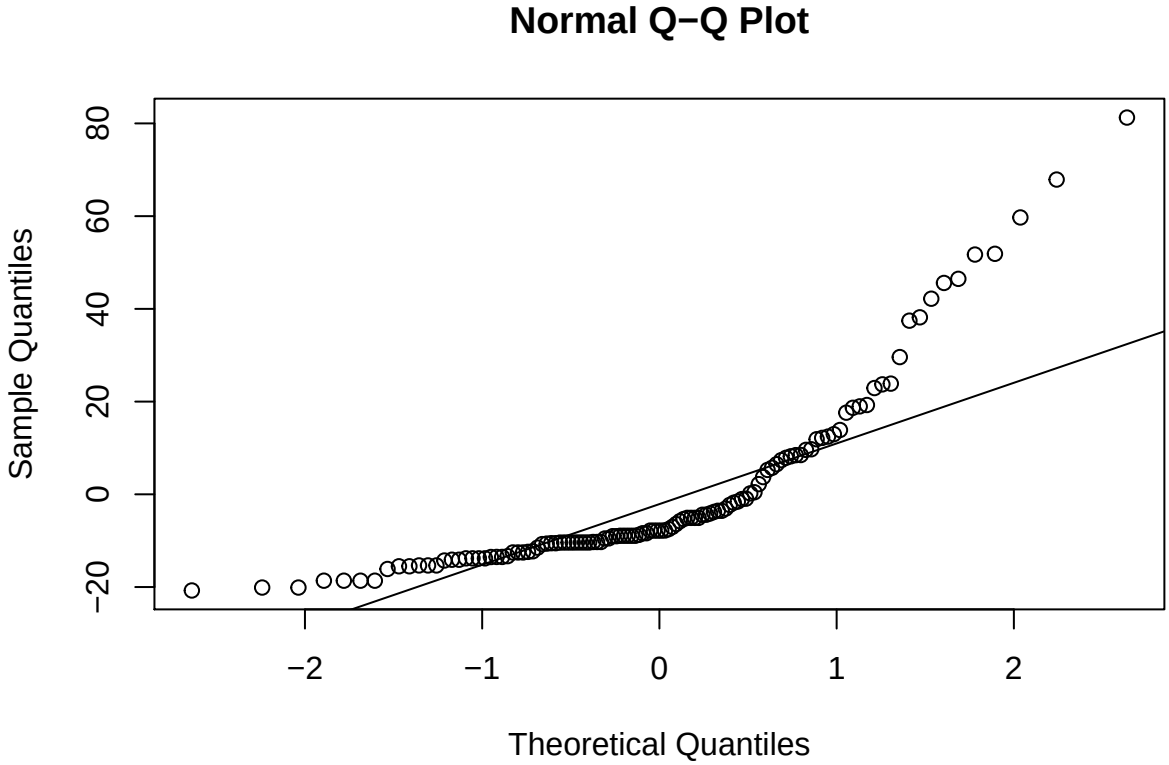


Figure 1: Histogram of abundance of zooplankton (Number / 10L) over all tanks and weeks.




```
##
## Call:
## glmmadmb(formula = Nt ~ average.temp + trophic.level + (1 | Tank),
##     data = data.N, family = "poisson")
##
```

```
## AIC: 1638.6
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)       10.7498     0.9741   11.04   <2e-16 ***
## average.temp      -0.4089     0.0178  -22.91   <2e-16 ***
## trophic.levelPZN  -1.2683     0.7888   -1.61     0.11
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##             Variance StdDev
## (Intercept)     2.97  1.723
##
##
## Log-likelihood: -815.286

##     chisq     ratio       rdf         p
## 25547.960   220.241   116.000     0.000

##
## Call:
## glmmadmb(formula = Nt ~ invTT + trophic.level + (1 | Tank), data = data.N,
##     family = "nbinom", zeroInflation = T)
##
## AIC: 744.7
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -48.763     21.795   -2.24    0.025 *
## invTT               1.316      0.554    2.38    0.017 *
## trophic.levelPZN   -0.300      0.266   -1.13    0.259
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##              Variance    StdDev
## (Intercept) 1.125e-07 0.0003355
##
## Negative binomial dispersion parameter: 0.81971 (std. err.: 0.19868)
## Zero-inflation: 0.3468  (std. err.:  0.055358 )
##
## Log-likelihood: -366.365

##       chisq       ratio         rdf           p
##  97.1449726   0.8374567 116.0000000   0.8975533

##
## Call:
## glmmadmb(formula = Nt ~ invTT + (1 | Tank), data = data.N, family = "nbinom",
##     zeroInflation = T)
##
```

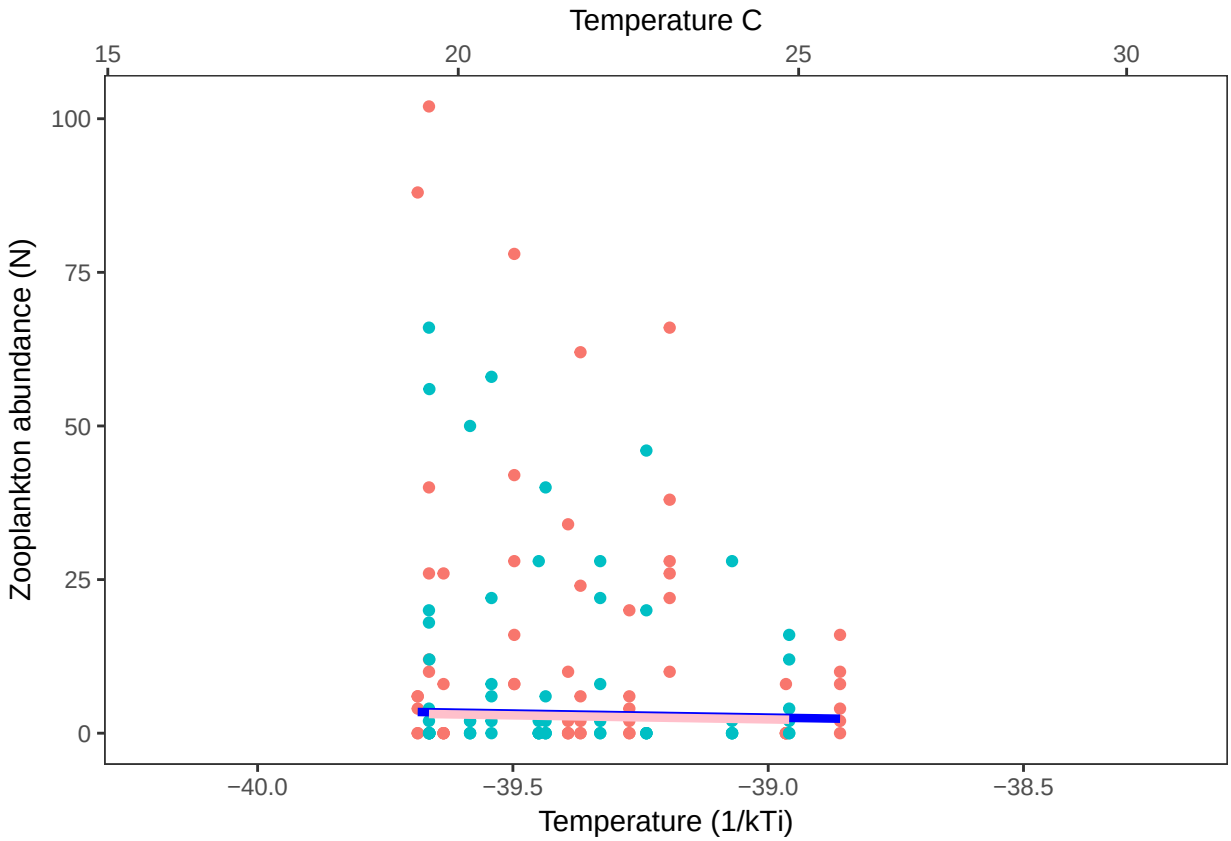
```
## AIC: 744
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  -47.413     21.824   -2.17    0.030 *
## invTT          1.278      0.554    2.31    0.021 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##              Variance  StdDev
## (Intercept) 0.0004209 0.02052
##
## Negative binomial dispersion parameter: 0.81391 (std. err.: 0.19578)
## Zero-inflation: 0.34831  (std. err.:  0.054838 )
##
## Log-likelihood: -367.001
```

```
##       chisq       ratio         rdf           p
##  98.1527933   0.8389128 117.0000000   0.8963517
```

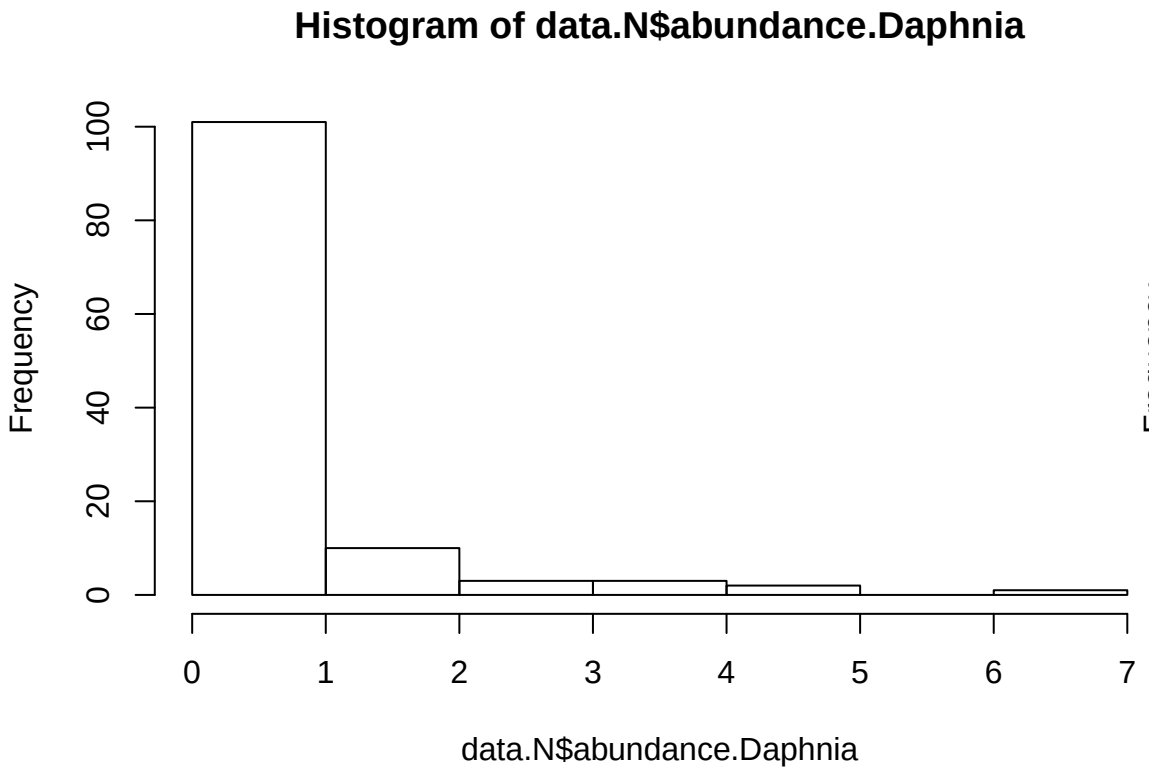
Table 1: Table S8: Model selection results for zooplankton abundance, with 1|Tank as a random effect. Model terms are: intercept (Int), trophic treatment (TL), Temperature - weekly average (Tw), temperature - expt average (Tt), interaction terms and statistical estimates

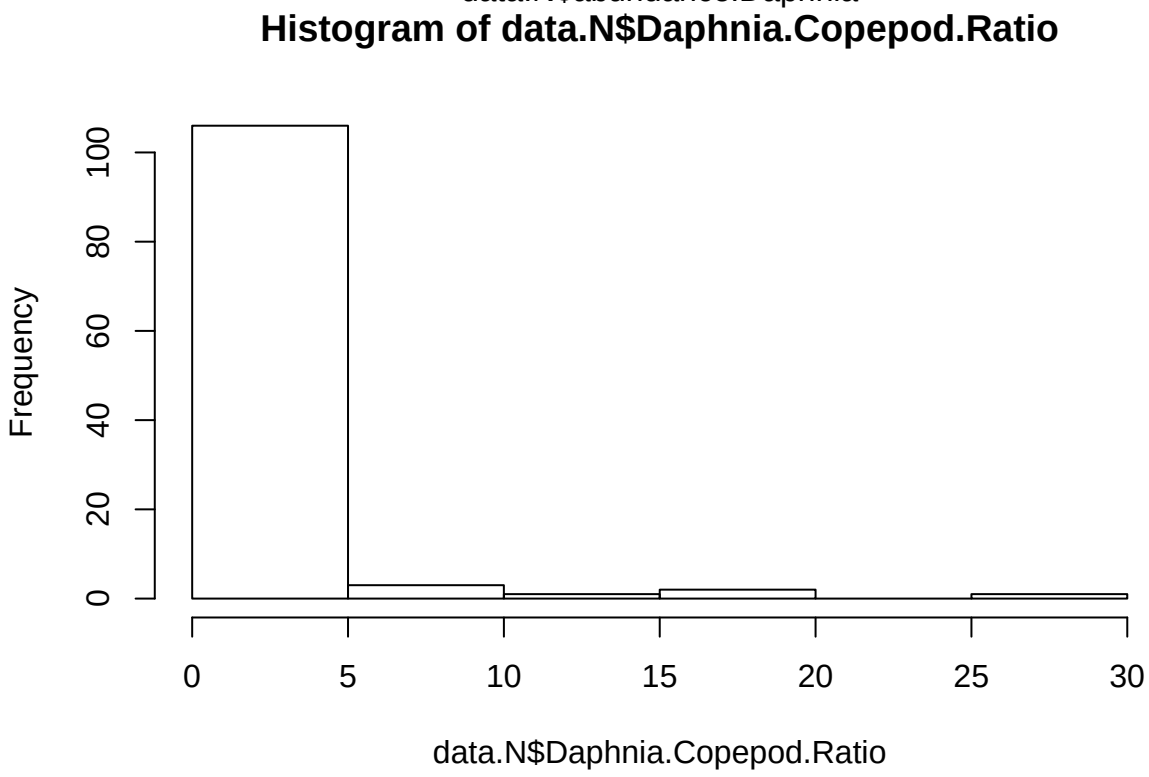
	Int	Tw	TL	df	logLik	AICc	d	w
nbinommod1b	-47.41	1.28	NA	5	-367.00	744.53	0.00	0.6159809
nbinommod1	-48.76	1.32	+	6	-366.37	745.47	0.95	0.3840191

Plotting data and model results



Trends within zooplankton species: Daphnia






```
##
## Call:
## glmmadmb(formula = abundance.Daphnia ~ invTT + trophic.level +
##     (1 | Tank), data = data.N, family = "poisson")
##
```

```
## AIC: 239.5
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -34.884     29.574   -1.18   0.2382
## invTT               0.875      0.751    1.17   0.2436
## trophic.levelPZN   -1.136      0.395   -2.87   0.0041 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##             Variance StdDev
## (Intercept)   0.2967 0.5447
##
##
## Log-likelihood: -115.749
```

```
##        chisq        ratio          rdf            p
## 141.39313552   1.21890634 116.00000000   0.05457386
```

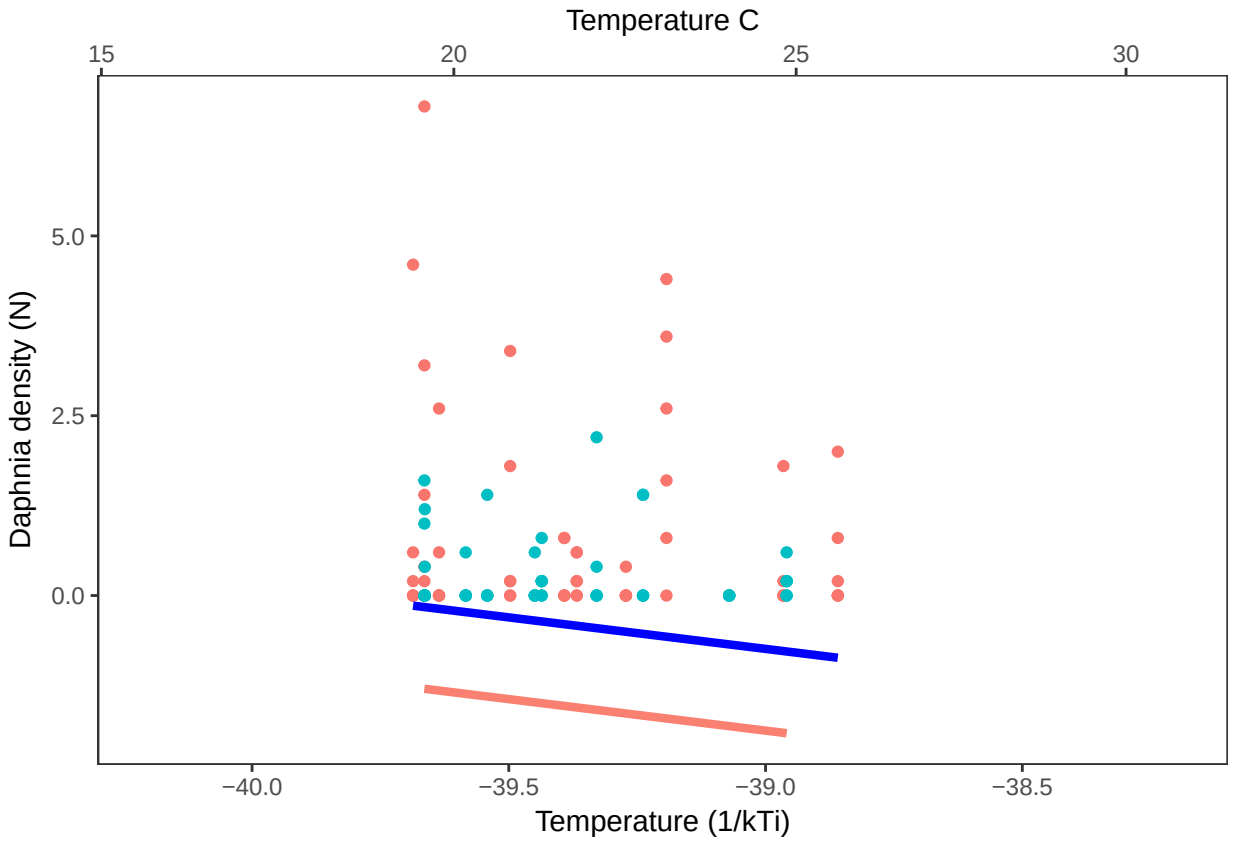
	(Intercept)	invTT	trophic.level	invTT:trophic.level	df	logLik	AICc	delta	weight
poismod.Db	-34.88	0.88	+	NA	4	-115.75	239.85	0.00	0.63118106
poismod.Da	-38.64	0.97	+	+	5	-115.73	241.98	2.13	0.21709779
poismod.Dd	-0.97	NA	NA	NA	2	-119.71	243.52	3.67	0.10060719
poismod.Dc	-31.32	0.77	NA	NA	3	-119.33	244.87	5.03	0.05111395

```
##
## Call:
## glmmadmb(formula = abundance.Daphnia ~ invTT + trophic.level +
##     (1 | Tank), data = data.N, family = "poisson")
##
## AIC: 239.5
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -34.884     29.574   -1.18   0.2382
## invTT               0.875      0.751    1.17   0.2436
## trophic.levelPZN   -1.136      0.395   -2.87   0.0041 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##             Variance StdDev
## (Intercept)   0.2967 0.5447
##
##
## Log-likelihood: -115.749
```

```
##
## Call:
```

```
## model.avg(object = poismod.Da, poismod.Db)
##
## Component model call:
## glmmadmb(formula = <2 unique values>, data = data.N, family =
##      poisson)
##
## Component models:
##     df  logLik   AICc delta weight
## 12   4 -115.75 239.85  0.00   0.74
## 123  5 -115.73 241.98  2.13   0.26
##
## Term codes:
##               invTT       trophic.level invTT:trophic.level
##                   1                   2                   3
##
## Model-averaged coefficients:
## (full average)
##                          Estimate Std. Error Adjusted SE z value Pr(>|z|)
## (Intercept)            -35.84489   31.00039    31.32720   1.144    0.253
## invTT                    0.89984    0.78702     0.79531   1.131    0.258
## trophic.levelPZN         2.41143   33.97797    34.32792   0.070    0.944
## invTT:trophic.levelPZN  -0.09002    0.86221     0.87109   0.103    0.918
##
## (conditional average)
##                         Estimate Std. Error Adjusted SE z value Pr(>|z|)
## (Intercept)            -35.8449    31.0004     31.3272   1.144    0.253
## invTT                    0.8998     0.7870      0.7953   1.131    0.258
## trophic.levelPZN         2.4114    33.9780     34.3279   0.070    0.944
## invTT:trophic.levelPZN  -0.3518     1.6771      1.6949   0.208    0.836
##
## Relative variable importance:
##                      invTT trophic.level invTT:trophic.level
## Importance:          1.00  1.00          0.26
## N containing models:    2     2             1
```

Plotting data and model results



Trends within zooplankton species: Copepods

```
##
## Call:
## glmmadmb(formula = abundance.copepods ~ invTT + trophic.level +
##     (1 | Tank), data = data.N, family = "poisson")
##
## AIC: 309
##
## Coefficients:
##                   Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -84.9712    25.1230   -3.38  0.00072 ***
## invTT              2.1446     0.6366    3.37  0.00075 ***
## trophic.levelPZN   0.0666     0.2725    0.24  0.80701
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##             Variance StdDev
## (Intercept)   0.1134 0.3368
##
##
```

```
## Log-likelihood: -150.483
##        chisq        ratio          rdf            p
## 2.125926e+02 1.832695e+00 1.160000e+02 1.159517e-07
##
## Call:
## glmmadmb(formula = abundance.copepods ~ invTT + trophic.level +
##     (1 | Tank), data = data.N, family = "nbinom", zeroInflation = F)
##
## AIC: 280.2
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -87.4988    28.0290   -3.12   0.0018 **
## invTT              2.2104     0.7108    3.11   0.0019 **
## trophic.levelPZN   0.0425     0.3055    0.14   0.8893
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##              Variance    StdDev
## (Intercept) 1.125e-07 0.0003355
##
## Negative binomial dispersion parameter: 0.79212 (std. err.: 0.24161)
##
## Log-likelihood: -135.096
##       chisq       ratio         rdf           p
## 119.4623601   1.0298479 116.0000000   0.3940529
##
## Call:
## glmmadmb(formula = abundance.copepods ~ invTT + (1 | Tank), data = data.N,
##     family = "nbinom", zeroInflation = F)
##
## AIC: 278.2
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)   -87.63      28.01   -3.13   0.0018 **
## invTT           2.21       0.71    3.12   0.0018 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of observations: total=120, Tank=20
## Random effect variance(s):
## Group=Tank
##              Variance   StdDev
## (Intercept) 5.331e-05 0.007301
##
## Negative binomial dispersion parameter: 0.79199 (std. err.: 0.24153)
##
## Log-likelihood: -135.106
```

	Int	Tw	TL	Tw*TL	df	logLik	AICc	d	w
poismod.Cc	-87.63	2.21	NA	NA	4	-135.11	278.56	0.00	0.67753474
poismod.Cb	-87.50	2.21	+	NA	5	-135.10	280.72	2.16	0.23026158
poismod.Ca	-96.20	2.43	+	+	6	-135.04	282.83	4.27	0.07997327
poismod.Cd	-0.34	NA	NA	NA	3	-140.19	286.59	8.03	0.01223041

Figure 4

s