Ant Climate Project

Path analysis. No transformation

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Initial comments:

Read in the ant data and prepare the variables for path analysis. There are 474 species for which data is available for colony size and climatic variables, excluding special ants.

When more than on climatic variable is present in the best model (based on AIC model selection), we divide the path analysis into multiple different analyses. This is because path analysis would not accept having more than one climatic predictor in the analysis because the linear models produced had highly significant relationships between the multiple climatic predictors being analysed. The potential model set is reduced to just four models for each analysis, based on all of the possible models given that colony size has a direct effect on the number of worker castes.

1 Summary

- Greater colony size favours both greater worker size variation and allows invasion into drier regions. Both path coefficients are significant.

2 PREavg

2.1 Create alternative causal models

The potential model set is reduced to just two models for each analysis.

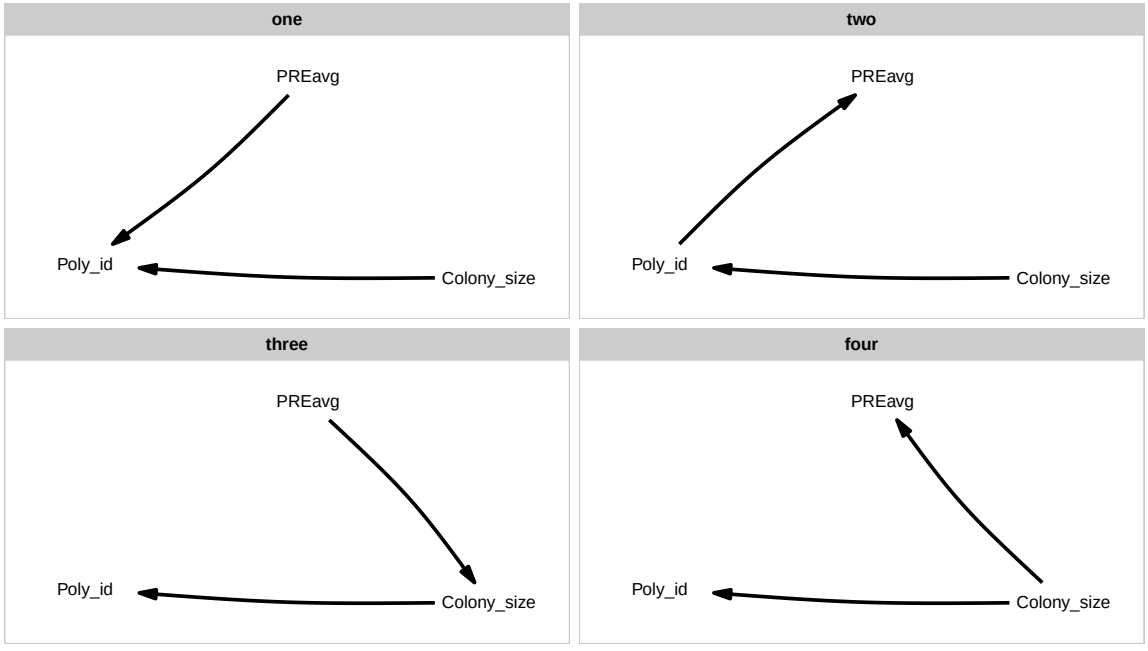


Table 1: NCuniform stem path analysis model selection summary table

model	k	q	C	p	CICc	CICc difference	l	w
three	1	5	0.55	0.76	10.68	0.00	1.00	0.47
four	1	5	0.57	0.75	10.69	0.02	0.99	0.46

Table 2: NCuniform crown path analysis model selection summary table

model	k	q	C	p	CICc	CICc difference	l	w
four	1	5	0.31	0.86	10.44	0	1	0.75

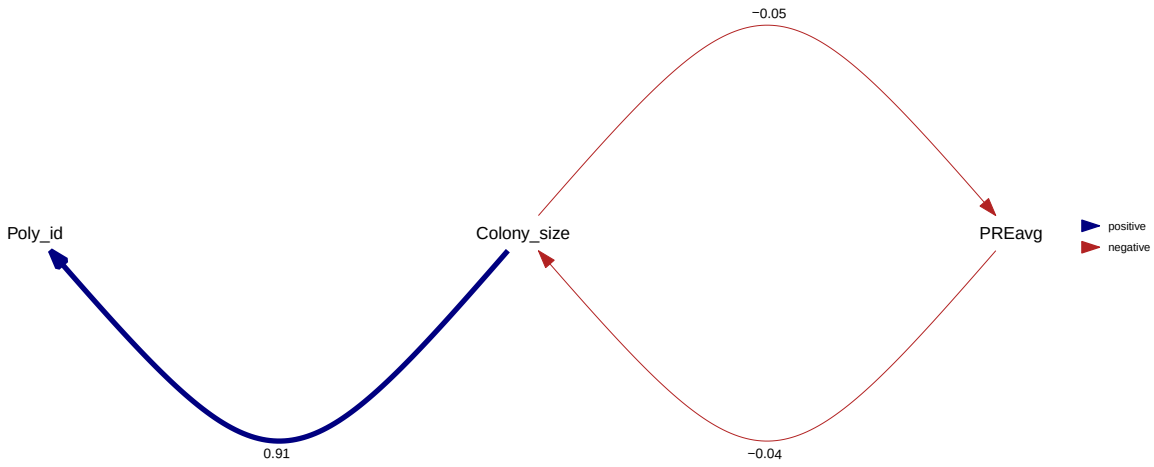
Table 3: FBD stem path analysis model selection summary table

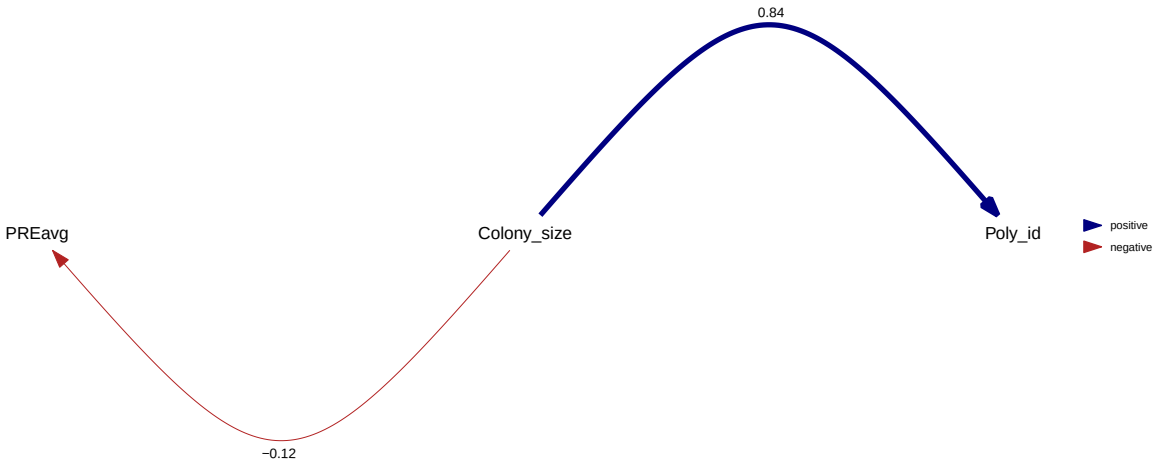
model	k	q	C	p	CICc	CICc difference	l	w
four	1	5	0.45	0.8	10.58	0	1	0.79

Table 4: FBD crown path analysis model selection summary table

model	k	q	C	p	CICc	CICc difference	l	w
four	1	5	0.29	0.87	10.42	0.00	1.00	0.62
three	1	5	1.58	0.45	11.71	1.29	0.52	0.33

2.2 Path analysis

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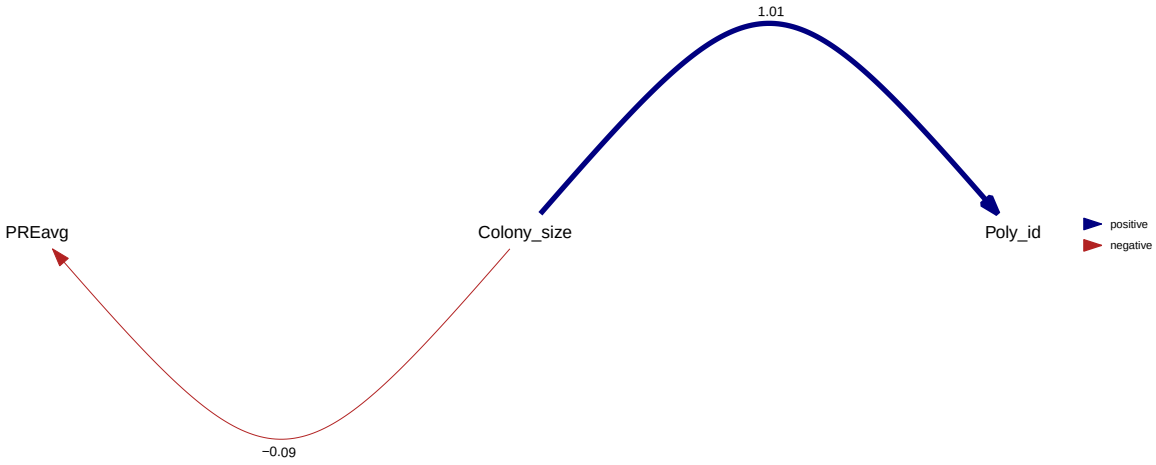
PREavg
Colony_size
Poly_id
positive
negative
−0.12


1.01
PREavg
Colony_size
Poly_id
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negative
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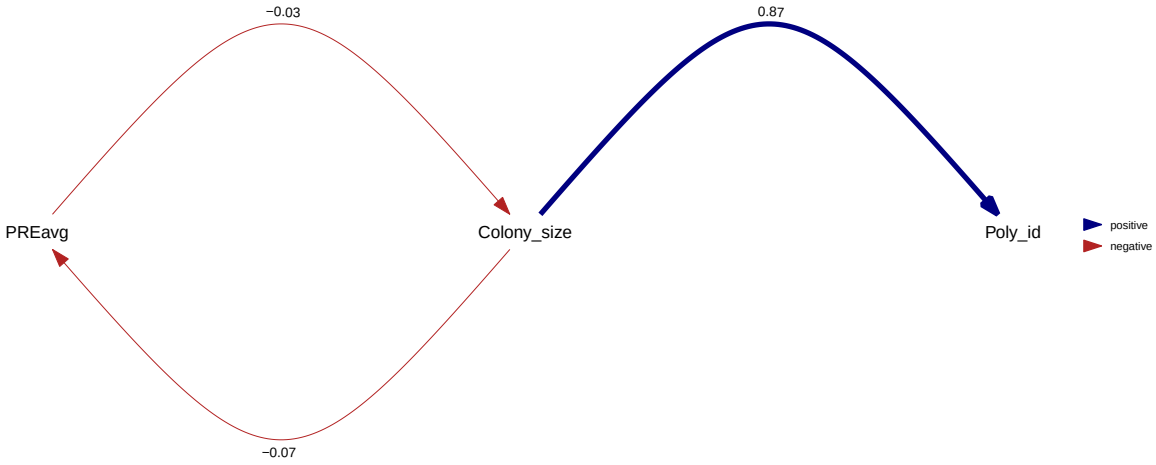
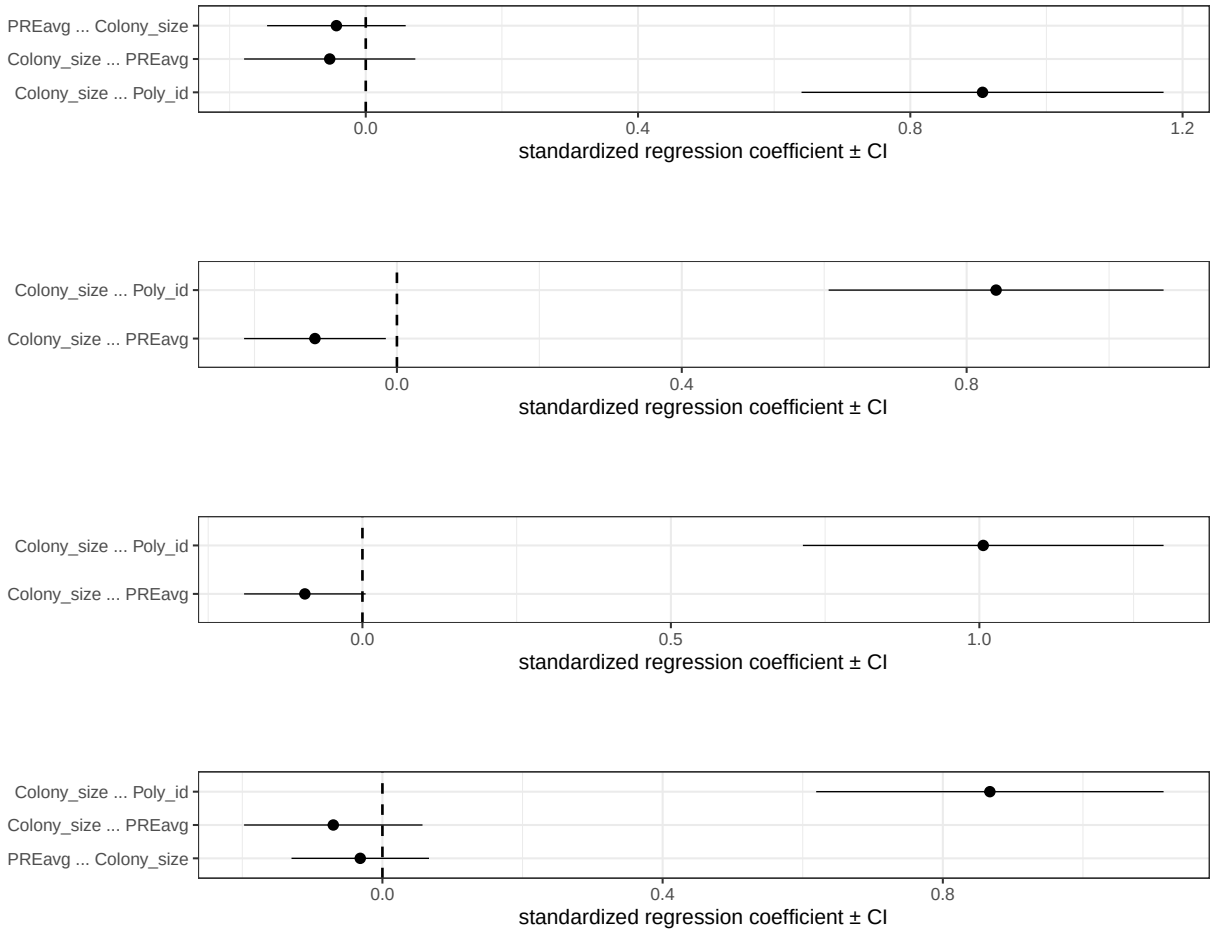
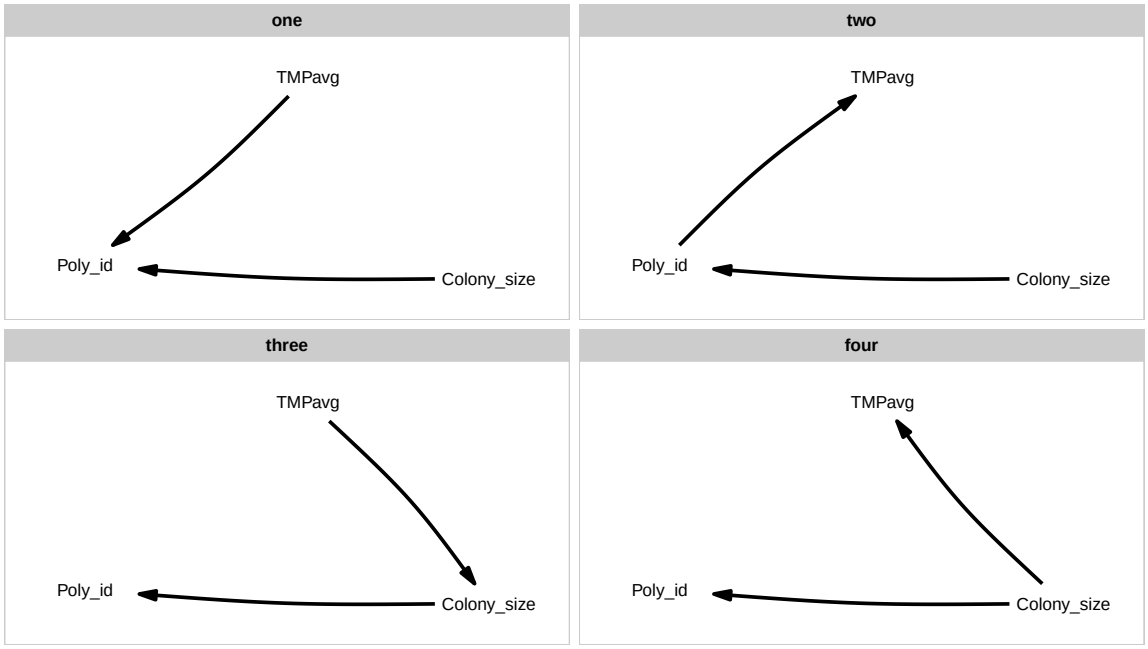

−0.03
0.87
PREavg
Colony_size
Poly_id
positive
negative
−0.07

2.2.1 Estimate confidence intervals for path coefficients



3 TMPavg

3.1 Create alternative causal models



3.2 Path analysis

Table 5: NCuniform stem path analysis model selection summary table

model	k	q	C	p	CICc	CICc difference	l	w
one	1	5	0.85	0.65	10.98	0	1	0.79

Table 6: NCuniform crown path analysis model selection summary table

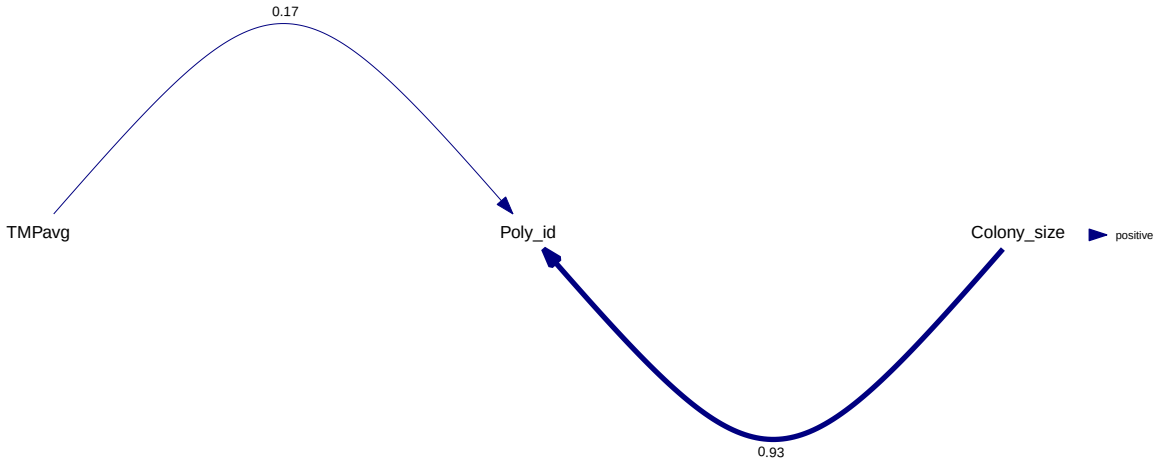
model	k	q	C	p	CICc	CICc difference	l	w
one	1	5	0.11	0.95	10.24	0	1	0.82

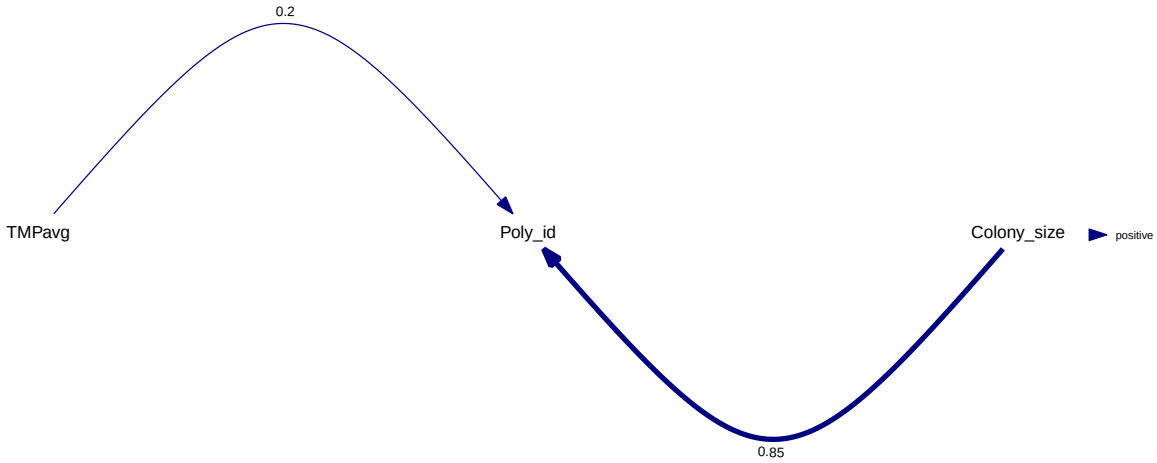
Table 7: FBD stem path analysis model selection summary table

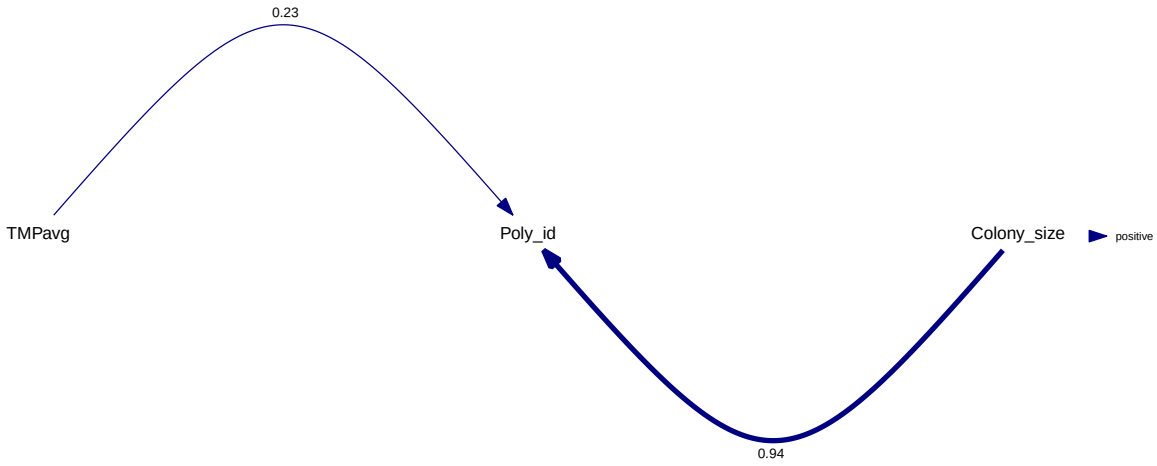
model	k	q	C	p	CICc	CICc difference	l	w
one	1	5	0.11	0.95	10.24	0	1	0.77

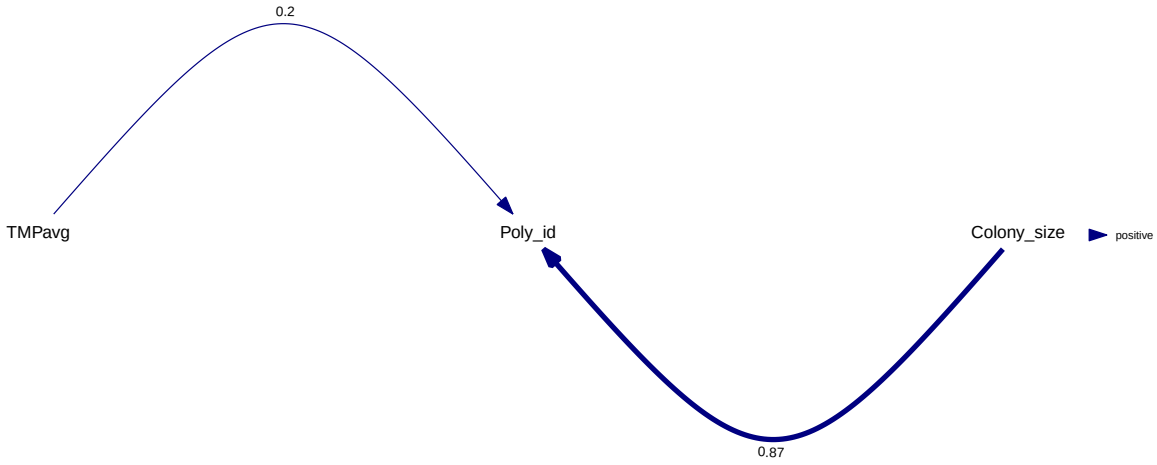
Table 8: FBD crown path analysis model selection summary table

model	k	q	C	p	CICc	CICc difference	l	w
one	1	5	0.76	0.68	10.89	0	1	0.87

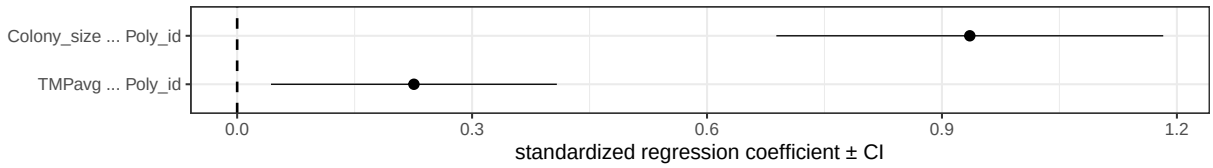








3.2.1 Estimate confidence intervals for path coefficients


Colony_size ... Poly_id
TMPavg ... Poly_id
0.0
0.3
0.6
0.9
1.2
standardized regression coefficient ± CI

Colony_size ... Poly_id
TMPavg ... Poly_id
0.0
0.3
0.6
0.9
standardized regression coefficient ± CI