MAR estimates[1]

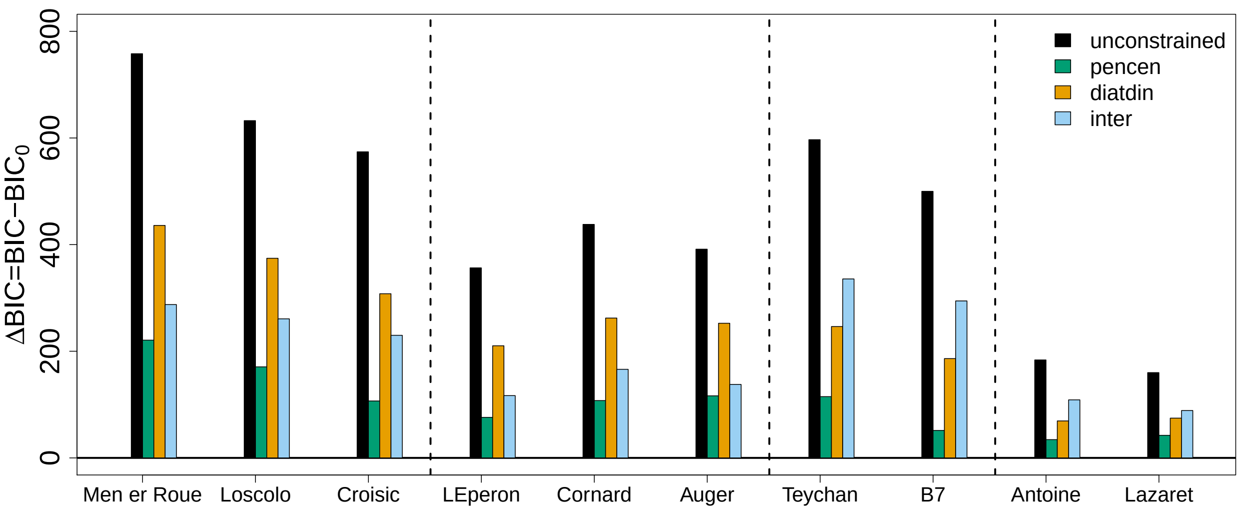

Figure 1: Comparison of BIC with different interaction matrices, compared to the null model (diagonal interaction matrix), for four different sites separated by dashed lines (Brittany, Marennes-Oléron, Arcachon Mediterranean Sea) and 10 different subsites. As model structures (length of the times series taken into account) are different between sites and subsites, groups of bars should not be compared.

[1] We should note that NEE does not like barplot...

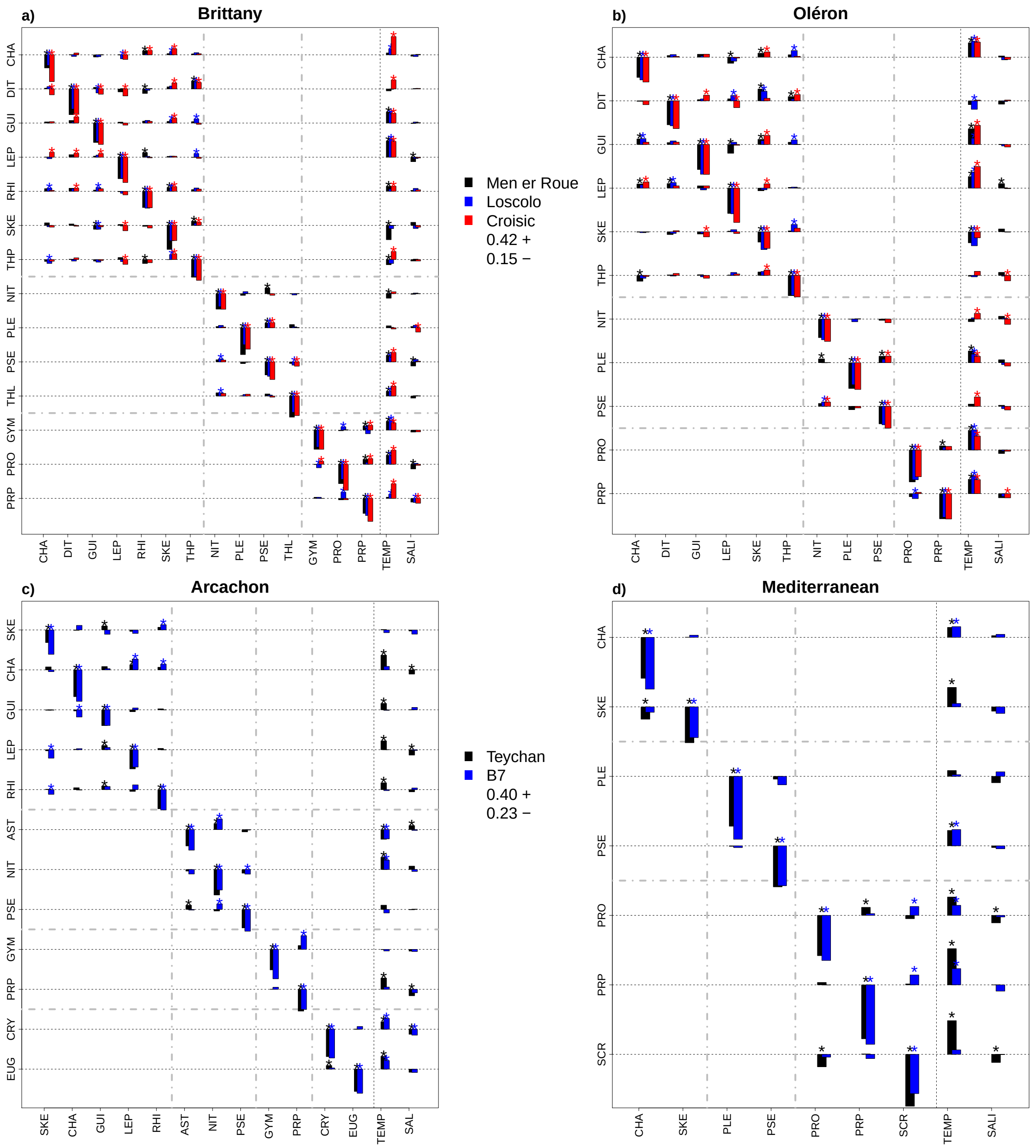

Figure 2: Coefficients of the pennate vs. centric MAR model for species which are present at the 10 sampling subsites, using temperature and salinity as covariates. The ratio of positive and negative interactions which have the same signs for all subsites in one site (not considering diagonal values, that is intragroup interactions) is shown below each legend.

Matrix 'meta-analysis'

Usual network metrics

We can use several metrics to describe the different matrices whose parameters we have estimated. In addition to choosing the metric(s), we should wonder which matrix we should use (all graphs shown here were computed on unconstrained matrix at first but I think it should be the pencen one because of the results in BIC).

- eigenvalues is the simplest (and should be linked with % of positive/negatives values)

	Unconstrained (eig)	% positive	Pennate/centric (eig)	% positive
Men er Roue	0.57	57	0.52	57
Loscolo	0.53	56	0.42	50
Croisic	0.65	52	0.50	49
L'Eperon	0.58	59	0.44	53
Cornard	0.49	51	0.46	47
Auger	0.57	55	0.51	55
Teychan	0.59	55	0.46	45
B7	0.64	50	0.57	38
Antoine	0.55	47	0.55	30
Lazaret	0.64	37	0.61	24

Table 1: Maximum eigenvalue and proportion of strictly positive interactions (compared to non-0 values) in the interaction matrices estimated in different sites, with a full matrix or a matrix only allowing interactions among pennate and centric diatoms, not between

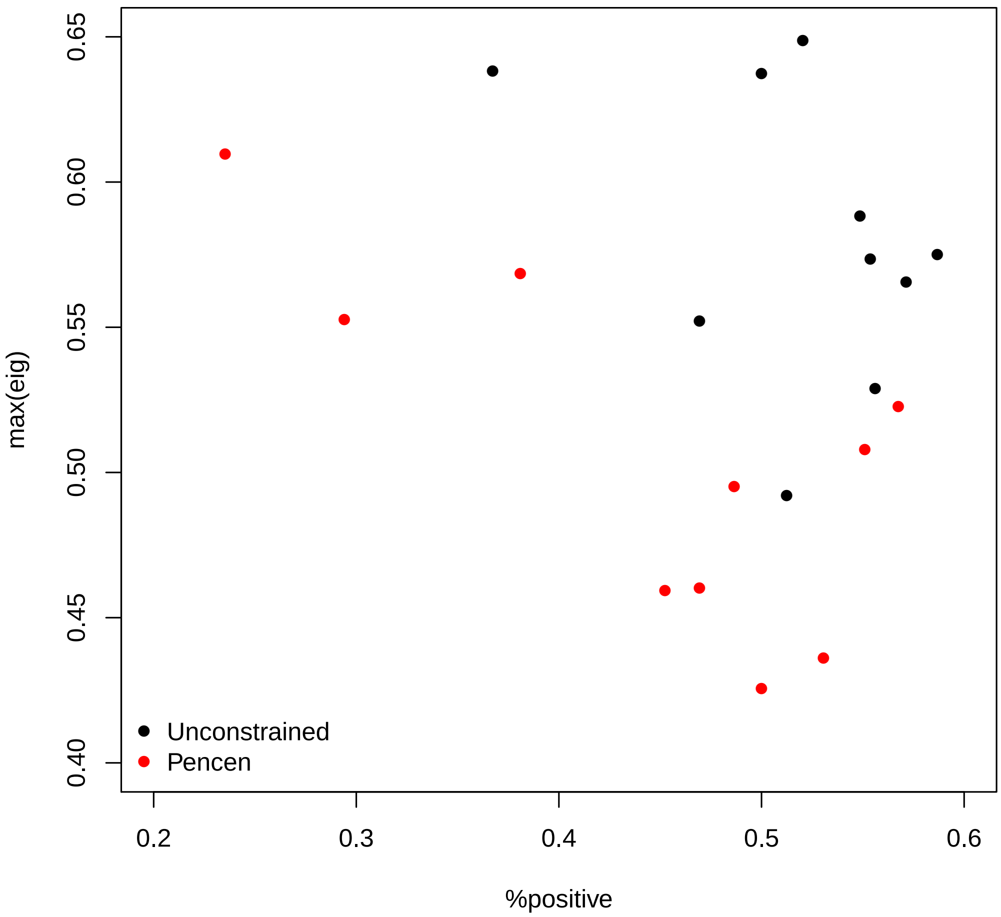

Figure 3: No obvious link between stability and proportion of positive interactions

- connectance

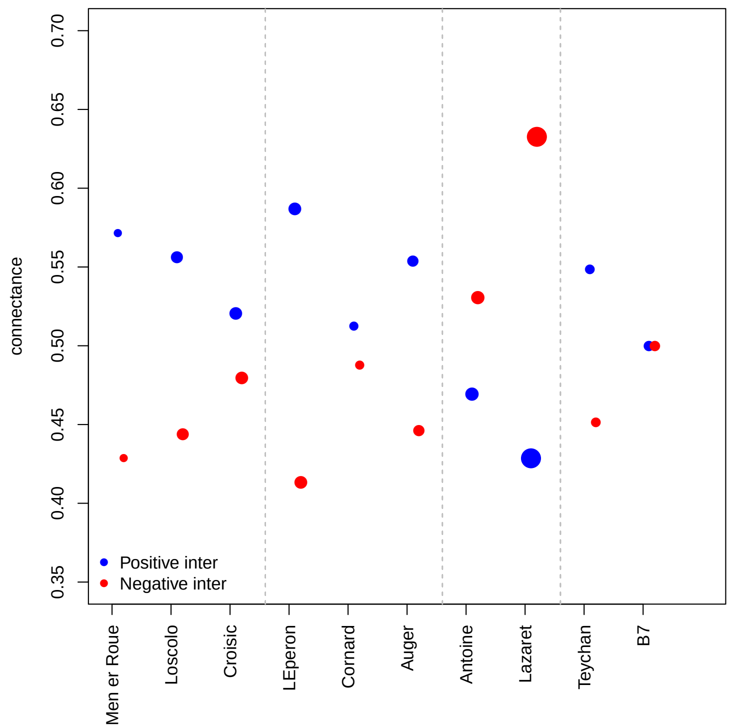

Figure 4: Connectance of the unconstrained interaction matrices estimated in 10 different subsites, differentiating positive and negative interactions

(for the next metrics, we need to consider absolute values and/or only negative and/or only positive interaction values)

- weighted connectance

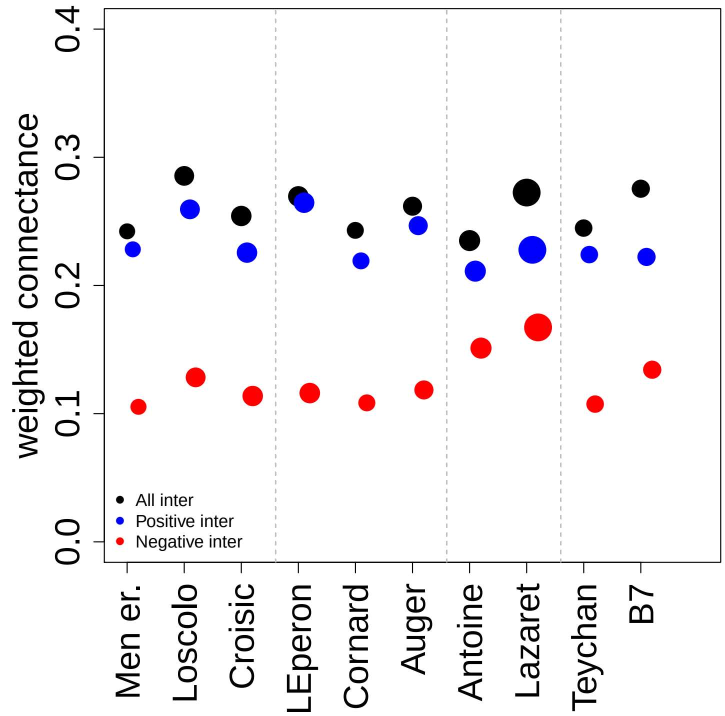

Figure 5: Weighted connectance of the unconstrained interaction matrices estimated in 10 different subsites, differentiating positive and negative interactions

- weighted linkage density (average of vulnerability and generality, see eq. 14 in Bersier et al. [2002])

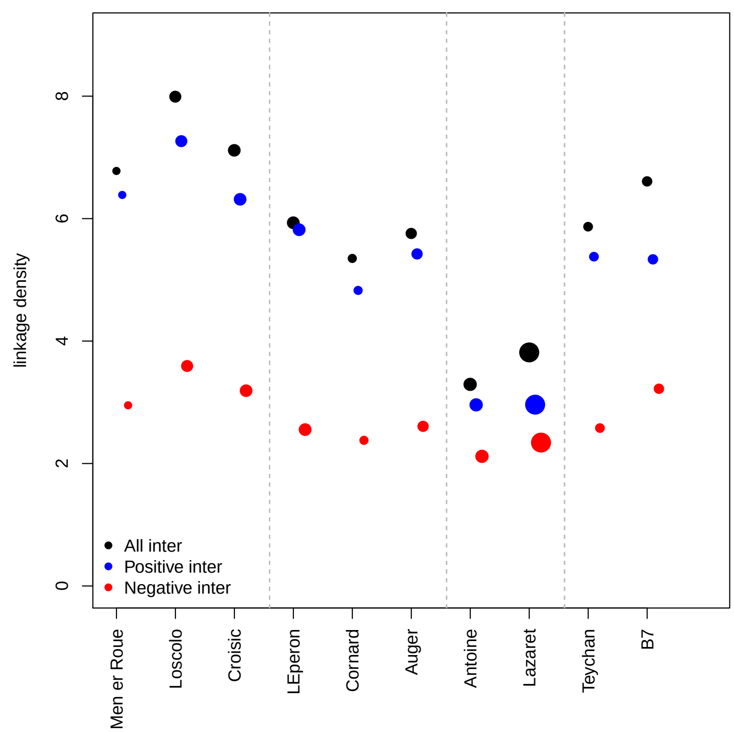

Figure 6: Weighted linkage density of the unconstrained interaction matrices estimated in 10 different subsites, differentiating positive and negative interactions

Covariance between self-regulation and competition with other groups

To examine a possible covariation of intra and inter-genus competition, we computed several indicators of inter-group competition. For each genus i, an index of vulnerability (computed on $b_{i.}$) and generality (computed on $b_{.i}$) can be computed. For these two indices, we computed the sum and average of raw and absolute values of the interaction coefficients.

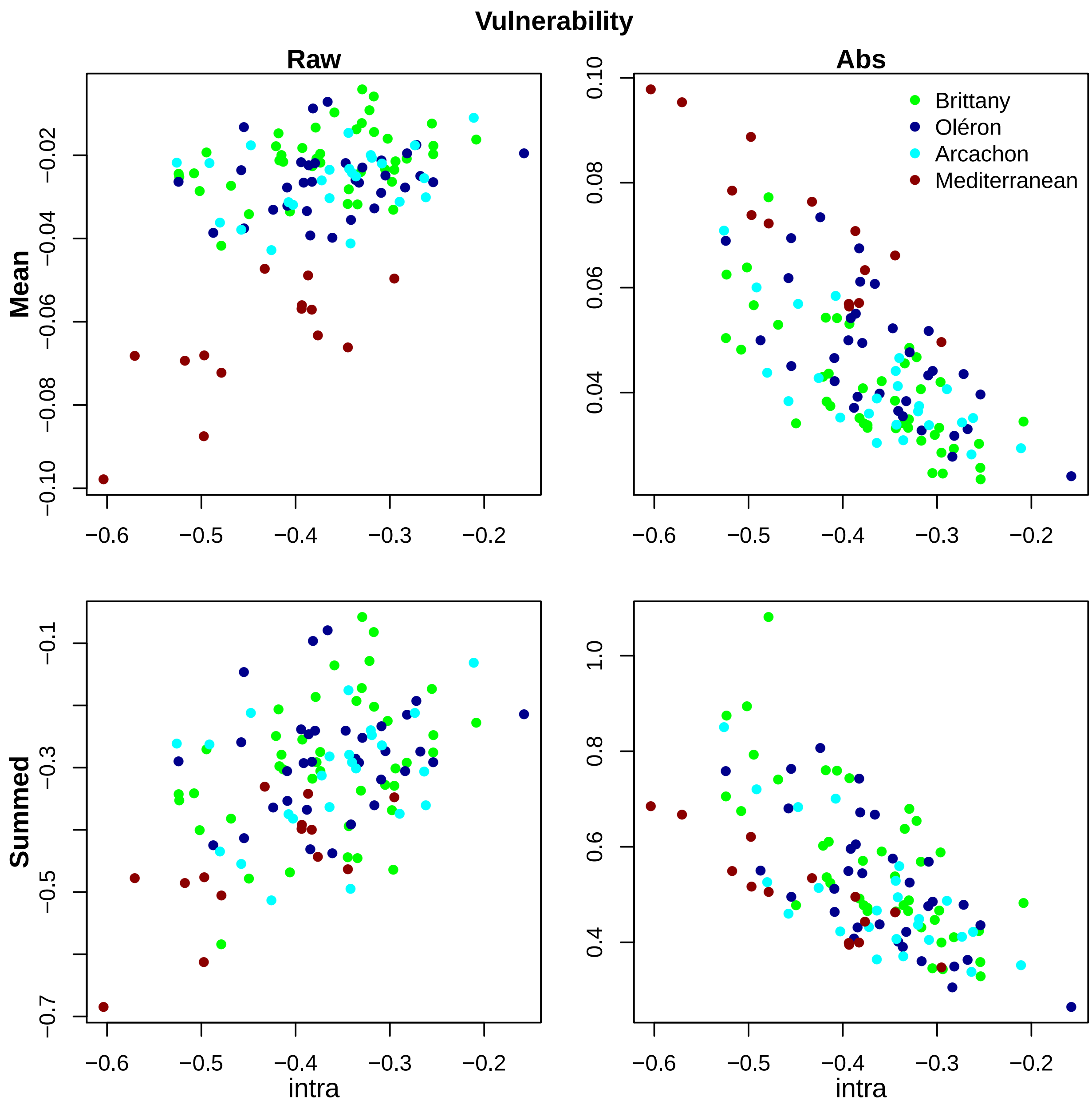

Figure 7: Mean (top) and summed (bottom) vulnerability for each species in 10 subsites, as a function of their self-regulation strength, taking into account facilitation and competition (raw values, left) or only the strength of the effect (absolute values, right), for a pennate/centric interaction matrix

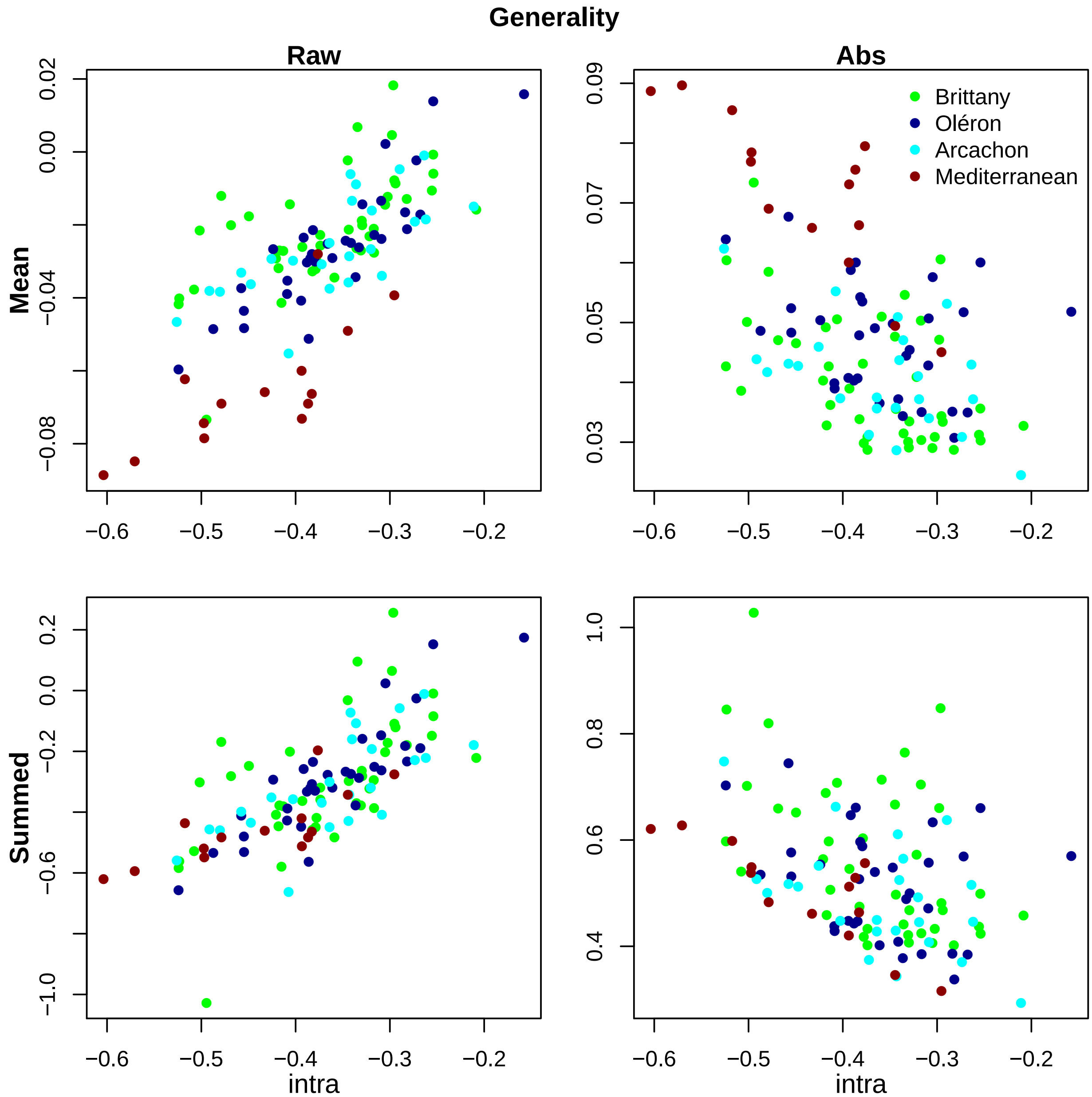

Figure 8: Mean (top) and summed (bottom) generality for each species in 10 subsites, as a function of their self-regulation strength, taking into account facilitation and competition (raw values, left) or only the strength of the effect (absolute values, right), for a pennate/centric interaction matrix

The more self-regulated a species is, the stronger the interactions of this species are, but the more it tends to engage in negative interactions.

For a given species, self-regulation is highly variable depending on the site.

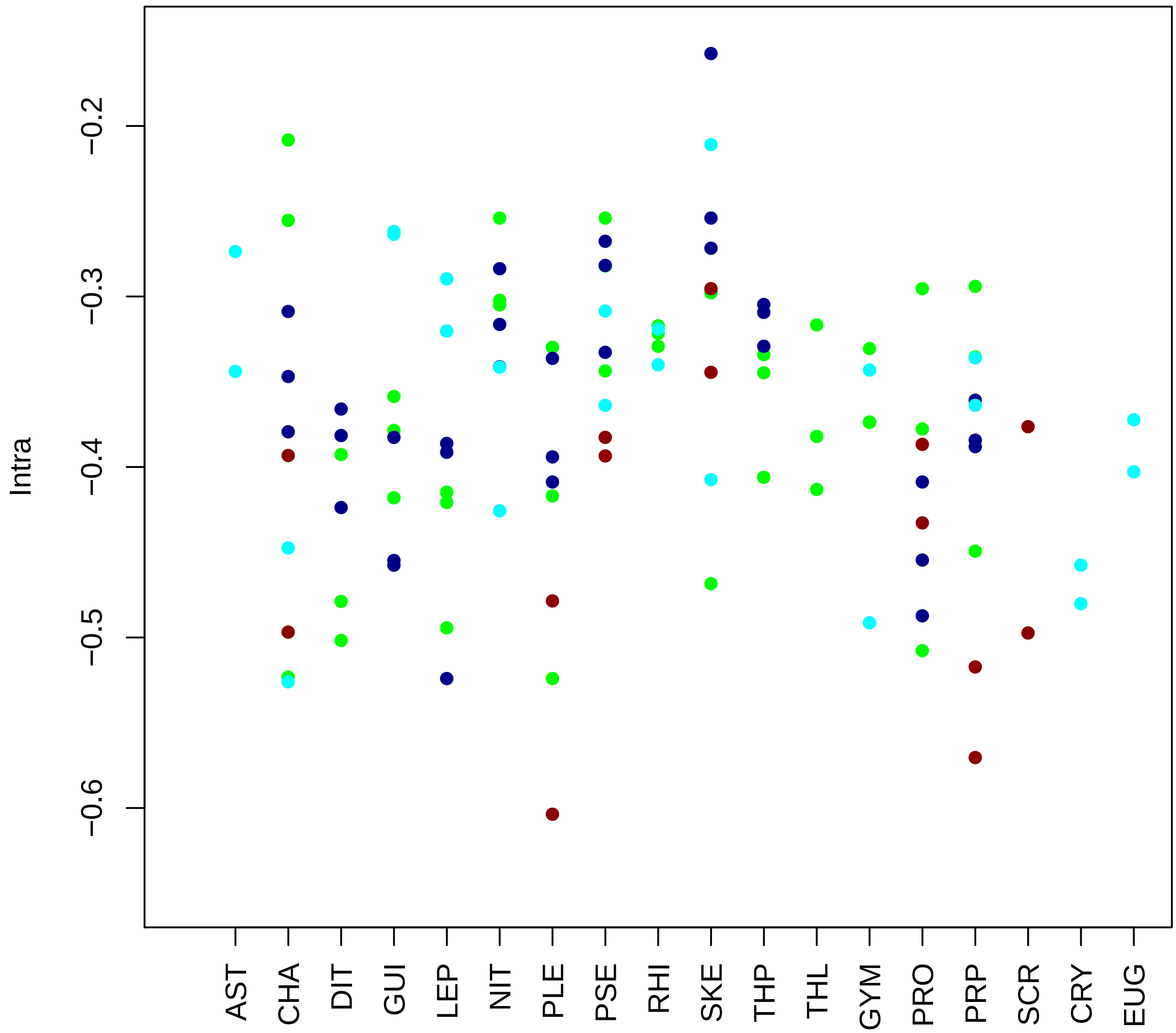

Figure 9: Intra-genus competition for each species in different sites for a pennate/centric interaction matrix

Discussed, not done (yet)

Finally, we also wanted to consider the variance between growth rate and intragroup competition (b_{ii} vs. $\bar{c_{i.}}$, or only consider eigenvalues? Would it make sense?)

In addition to averaging, we can consider the standard deviation of intergroup coefficients and environmental effects.

References

Louis-Felix Bersier, Carolin Banašek-Richter, and Marie-France Cattin. Quantitative descriptors of food-web matrices. *Ecology*, 83(9):2394–2407, 2002. URL `http://onlinelibrary.wiley.com/doi/10.1890/0012-`

9658(2002)083[2394:QDOFWM]2.0.CO;2/full.