I think there is quite a lot we can do to assess how relationships between climatic factors and selection gradients depend on the four parameters used in Hunter’s et al. approach, even if we are not able to do a formal sensitivity analysis.

Two types of analyses:

**First**, we could use the predictors identified in the model of selection gradients (Table 2B), and run different models, analogous to the selection model, examining their effect on:

(1) trait means

FFDindividual unstandardized ~ Number of flowersunstandardized + Precipitation March + Precipitation April + Minimum Temperature April

(2) trait variances

FFDresiduals ~ Number of flowersunstandardized + Precipitation March + Precipitation April + Minimum Temperature April

The model for trait variation would be very similar to the one we have now (Table 1), but using the same set of predictors as in Table 2B.

The tricky part is to examine effects on the variance in FFD, as there are not really any models for that. However, one possibility might be to use the effect estimates from model 1 (of effects of climatic variables on FFD values) to calculate the residuals for each individual (which then correspond to the variance around the estimated means), and regress these residuals on the climatic variables from Table 2B.

(3) mean fitness

Fitnessindividual, absolute ~ Number of flowersunstandardized + Precipitation March + Precipitation April + Minimum Temperature April

Model 3 would be quite similar to one we already have for fitness, but using the same set of predictors as in Table 2B.

(4) unstandardized trait – absolute fitness relationships

Fitnessindividual, absolute ~ Number of flowersunstandardized? + FFDunstandardized + Precipitation March × FFDunstandardized + Precipitation April × FFDunstandardized + Minimum Temperature April × FFDunstandardized

Model 4 would be identical to the one in Table 2B but using unstandardized trait values and absolute fitness. This analysis by itself would be key to determine if our observed relationships between climatic variables and selection was due to changes in trait-fitness relationships, and if we cannot do everything, then I think this is really the analysis that we need to do.

**Second**, to examine the relative importance of these four components for among-year variation in selection gradients, we could simply regress yearly estimates oF selection gradients of FFD on yearly means of:

(1) trait means

ßFFD(selection gradient)year t – FFDmean year t

(2) trait variance

ßFFD(selection gradient)year t – FFDvariance year t

(3) mean fitness

ßFFD(selection gradient)year t – Fitnessmean year t

(4) unstandardized trait – absolute fitness relationships.

ßFFD(selection gradient)year t – Regression coefficient of absolute fitness on unstandardized FFD and unstandardized flower numberyear t

This would be analogous to a key factor analysis and tell us how much of the variation in selection gradients that was explained by each of the four components.

* If we do something like this, then I think these results could form a separate result paragraph appearing last in the result section.
* We can then omit the current analysis of effects on mean fitness, and let analyses of mean fitness be part of the examination of what underlie the observed relationship between climatic factors and selection gradients.
* Then we also might merge current question 2 and 3, and add a new question after these: How is climatic factors related to the four components of the selection gradients; trait means, trait variances, mean fitness, and trait – fitness relationships?