Practical Basic concepts of GxE

Use the Excel sheet 'Practical basic concepts.xls'.

1. Plot the reaction norms in Excel.
2. Do you observe reranking of genotypes?
3. Calculate the correlation between environments -2 and 0 with the rest of environments. Hint: sort the table on environment and use the function 'correl'.
4. Do you observe heterogeneity of variance between environments?
5. Calculate the variance in the five environments.
6. What is the most sensitive genotype?

Concepts of stability

7. What is the most stable genotype with respect to type 1 stability?
8. What is the most stable genotype(s) with respect to type 2 stability?
9. Which genotype(s) has/have the highest performance across environments assuming equal frequencies of environments?

Use R-code 'stability.r'

10. You can vary the parameters mu (overall mean), b (slope as deviation from 1), vare (residual variance) and g (deviation from overall mean). Make two genotypes: one with a high predictability and one with a low predictability and make a plot. Play around with the input values to get some feel for differences in slope and variability. Look also at the coefficient of determination.
11. Let's consider genotype 1: g=1, b=0.5 and vare =0.5; genotype 2: g1=-1, b=-1, vare=0.1. Which genotype would you prefer in fields with a low average yield, i.e. -2sd?
12. Please specify characteristics for preferred varieties, when weather conditions will vary more due to climate change and the use of fertilizer needs to be reduced.