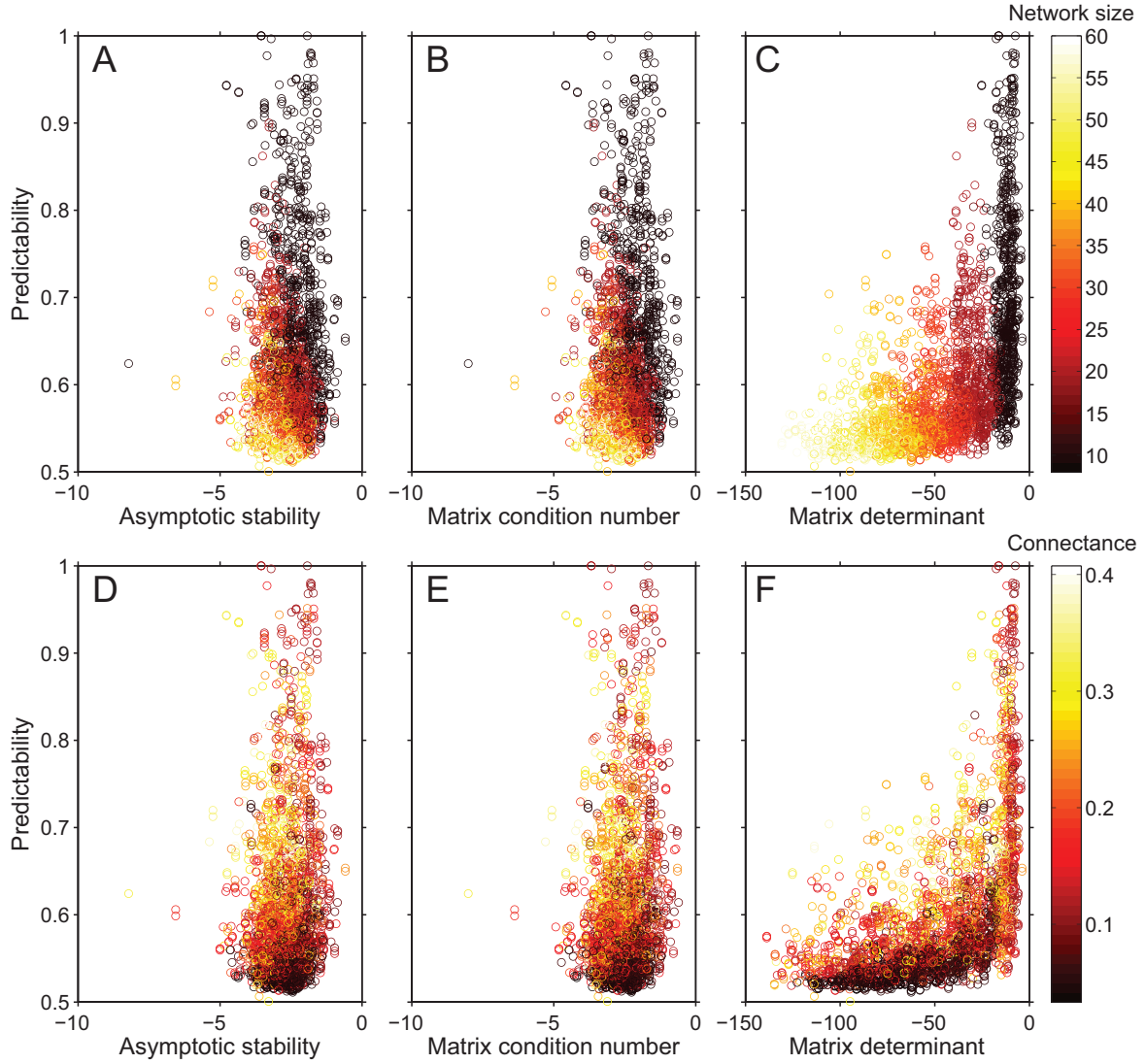


## **Appendix D from A. C. Iles and M. Novak, “Complexity Increases Predictability in Allometrically Constrained Food Webs” (Am. Nat., vol. 188, no. 1, p. 87)**

### **Predictability Related to Stability, Matrix Condition Number, and Matrix Determinant**

Assessing asymptotic stability by the maximum eigenvalue ( $\lambda_{\max}$ ) shows no relationship with predictability, as defined by directional determinacy, or the sensitivity of qualitative predictions to an order-of-magnitude ( $F = 10$ ) variation in interaction strength estimates (fig. D1A, D1D). The matrix condition number ( $|\lambda_{\max}/\lambda_{\min}|$ ) is often used to quantify the sensitivity of a matrix to inversion. The networks of our analyses were all well conditioned and evidence no relationship between condition number and predictability (fig. D1B, D1E). The determinant of the community matrix,  $\det(\mathbf{A})$ , scales the magnitudes of  $-\mathbf{A}^{-1}$  and reveals a positive relationship between predictability and the overall magnitude of species responses. Like network predictability, the matrix determinant is sensitive to network size and connectivity (fig. D1C, D1F).



**Figure D1:** Relationship between network predictability (as measured by directional determinacy) and asymptotic stability ( $\log_{10}(|\lambda_{\max}|)$  (A, D), matrix condition number ( $\log_{10}(|\lambda_{\max}/\lambda_{\min}|)$  (B, E), and the matrix determinant ( $\log_{10}(\det(\mathbf{A}))$ ; C, F) for networks of varying size (A–C) and connectance (D–F). Predictability reflects the mean proportion of net effects with the correct sign after up to an order-of-magnitude error is introduced to all interactions ( $F = 10$ ).