

Study Guide for Exam 2
Anth/Bio 5471: Spring 2008
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Patch model (1) a question like Exercise 7.1. (2) Discuss Cowie’s study on great tits. (3) Discuss the patch model in the context of the species of your choice. Has anything important been left out? How might the missing part be added?

Game theory I will probably give you a graph or two like those in Ch. 8. You should be able to find the equilibria on such a graph and determine which ones are stable. What does it mean to say that a game is symmetric? Asymmetric? Pairwise? What does it mean to say that strategies are discrete? Continuous? Pairwise games with discrete strategies are often described using a payoff matrix like the one below:

		Opponent	
		A	B
Ego	A	3	1
	B	1.5	2

I may give you such a matrix and ask questions like: (a) Which pure strategies (if any) are ESSes? (b) Is there a mixed ESS? (b) Make a graph of the game.

I will not ask such a question about asymmetric games, because you haven’t had enough practice with those. I may however ask about the particular asymmetric game (involving scale-eating fish) that I went over in detail.

Be familiar also with the other specific games—hawk-dove, sex ratio, and parasitoid wasps—that I discussed in class and in the text. You need to be familiar with the models, but also be ready for a more global question about each of these games. For example, why is the hawk-dove game famous? What problem did it solve? What does the model of scale-eating fish predict, and what is observed in the real world?

You are *NOT* responsible for the chapter on N -person games.

Culture What are (a) the argument for weak constraints, and (b) the argument from natural origins? How does my 1988 paper bear on these arguments? What problems arise if you define “adaptation” to be

the result of natural selection? Be able to reproduce the graphical argument in that paper, and to explain what it implies. I won’t ask detailed questions about the algebra. I might ask something about the result involving r . Be able to explain how r is defined in that paper, and what the results involving r imply about the two arguments (a and b), mentioned above.

Variations and covariances Be familiar with all three variants of the formulas for variance and covariance, which you will find in Appendix C. You should also be able to calculate these quantities from data, either in this format:

X	Y
3	2
4	3
2	2

or in this one:

P_{XY}	X	Y
1/3	3	2
1/2	4	3
1/6	2	2

Here, P_{XY} is the relative frequency of the observation (X, Y) . You should be able to calculate means, variances, and covariances from either sort of data.

Covariance selection In view of the limited exposure you will have had to Price’s formulation, there is not much that I can reasonably ask you. Here are some possibilities: (1) Define the terms in Price’s equation. (2) Why does Price’s formulation simplify when x is an allele frequency, and the population consists of diploids that mate at random? (See sec 11.2.1.) (3) Given data like those in Table 11.1 of the text, use the simple form of Price’s equation to calculate Δx .