Genetic Variation in Populations Problem Set

Conservation Biology
Spring 2009

There are a lot of calculations here. One good way to do this problem (which is not to be handed in) is to do it in a group of 2 or 3 where each person does part and you check each other's work. If you do work in a group, be sure that everyone can and does do the calculations

1. Suppose that you are studying two populations. You use RFLP and get the following data for six independent genetic loci:

		# individuals with a particular genotype	
Locus	genotype		Population #2
A			
	AA	10	0
	aa	0	49
	heterozygote	0	1
B			
	BB	0	4
	bb	10	42
	heterozygote	0	4
C			
	CC	3	32
	cc	7	4
	heterozygote	0	14
D			
	DD	1	8
	dd	3	12
	heterozygote	6	30
E			
	EE	0	46
	ee	0	0
	heterozygote	10	4
F			
	FF	3	5
	ff	2	9
	heterozygote	5	36
	N individuals sampled	10	50

Using the 95% threshold, calculate *P* and *H* for each population. Note: remember to calculate *H* using all the loci (see textbook).
Filing out the table below will help you find your answer.

Locus		Population #1	Population #2
A	Freq(A)		
	Freq(a)		
	Is locus A polymorphic?		
	Freq of Aa heterozygotes		
B	Freq(B)		
	Freq(b)		
	Is locus B polymorphic?		
	Freq of Bb heterozygotes		
C	Freq(C)		
	Freq(c)		
	Is locus C polymorphic?		
	Freq of Cc heterozygotes		
D	Freq(D)		
	Freq(d)		
	Is locus D polymorphic?		
	Freq of Dd heterozygotes		
E	Freq(E)		
	Freq(e)		
	Is locus E polymorphic?		
	Freq of Ee heterozygotes		
F	Freq(F)		
	Freq(f)		
	Is locus F polymorphic?		
	Freq of Ff heterozygotes		
	Polymorphism (*P*)		
	Heterozygosity (*H*)		

What do your results mean – explain what *P* and *H* mean?
What do they mean in terms of the genetics of these two populations (compare them)?
What is the expected frequency of heterozygotes for each locus (use the frequencies you calculated above and then the appropriate term from the H-W equation that we learned earlier in the course. Use these predicted frequencies to calculate the expected heterozygosity, H_E. Compare the expected values with the real values. What does this suggest about this population?

Also try the problems at the end of the chapter.