Biology 4605 / 7220 Name _____
Quiz #3a 23 September 2002

The Nicholson-Bailey equations of parasitoid-host interactions are as follows.

$H(t+1) = b \cdot H(t) \cdot [e^{-a \cdot P(t)}]$ *for hosts*

$P(t+1) = c \cdot H(t) \cdot [1 - e^{-a \cdot P(t)}]$ *for parasitoids*

H(t+1) = number of hosts in the next generation *(t+1)*
P(t+1) = number of parasitoids in the next generation *(t+1)*
a = search efficiency of the parasitoid
c = number of parasitoid offspring resulting from an attack of a host
b = per capita birth rate of hosts

1. If *H(t), H(t+1), and P(t+1)* all have units of organisms per cm^2 of leaf in a particular tree, what must be the units of search efficiency *a* _____

per capita birth rate of hosts *b* _____

2. Complete the following table.

P(t)	*H(t)*	*a*	*b*	*H(t+1)*
10	100	3%	2	_____
10	100	6%	2	_____
10	100	9%	2	_____

3. In words, what happens to the number of hosts in the next generation when parasitoid search efficiency doubles?

4. If *t* has units of days, what units will the quantity ΔH have ?

$$\Delta H = \frac{H(t+1) - H(t)}{t}$$

5. For a parasitoid on potato nematode hosts, which is more effective, doubling the parasitoid efficiency or halving the host rate of increase *b* ?