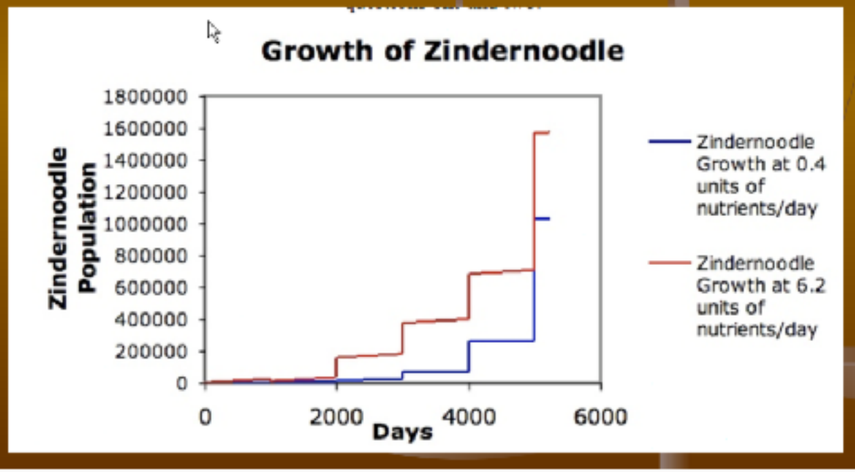
Zindernoodles

An Exercise in Counting on the relevant timescales

Counting is Hard!

Key is Step Function Growth

- Rainfall doesn't matter within the 4000-5000 day timescale



You can assume either that the zinderbites production depends on the number of zindernoodles in the system or not since in the end, it doesn't matter at all

Factor of 4 growth every 1000 days completely dominates any additional inputs to system nutrients.

1. I would assume that the zindernooble will demise around 4000 and 5000 days.

1000 day time cycles	Zindernoodle Population from initial 1000	Zindernoodle Population from rain at 10 in	
1	**4,000**	**400**	
2	**16,000**	**800**	
3	**64,000**	**1,200**	65,200
4	**256,000**	**1,600**	257,600
5	**1,024,000**	**2,000**	1,026,000

2. When comparing a cycle of rainfall and changing it to 30 inches the numbers seem to increase in total nutrients. Going from 16,400 to 22,000.

Rainfall (inches)	Nutrients from de	Zinderbites nutrie	total nutrients
10	16000	400	16,400.00
30	16000	6235.382907	22,235.38

		born from zinderbites			
days	born from OG 1000	10 in rain	total	30 in rain	total
1000	4000	400	4400	6235	10235
2000	16000	800	16800	12471	28471
3000	64000	1200	65200	18706	82706
4000	256000	1600	257600	24942	280942
5000	1024000	2000	1026000	31177	1055177
6000	4096000	2400	4098400	37412	4133412
7000	16384000	2800	16386800	43648	16427648
8000	65536000	3200	65539200	49883	65585883
9000	262144000	3600	262147600	56118	262200118

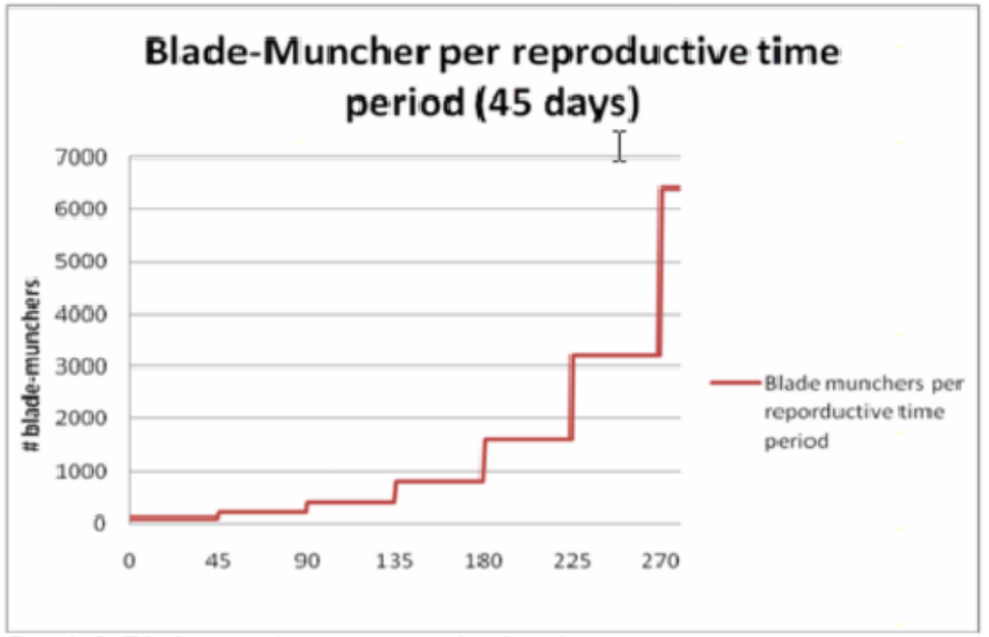
Part 2 –Counting in 5 days

Days	Muncher population	Munchette Population	Zinder-noodle population
0	**100**	0	1000
5	100	0	1000
10	100	0	900
15	100	100	900
20	100	100	800
25	100	100	800
30	100	200	700
35	100	200	700
40	100	200	600
45	**200**	300	600
50	200	300	400
55	200	300	400
60	**300**	400	100
65	300	400	100
70	300	400	-200

Another Table

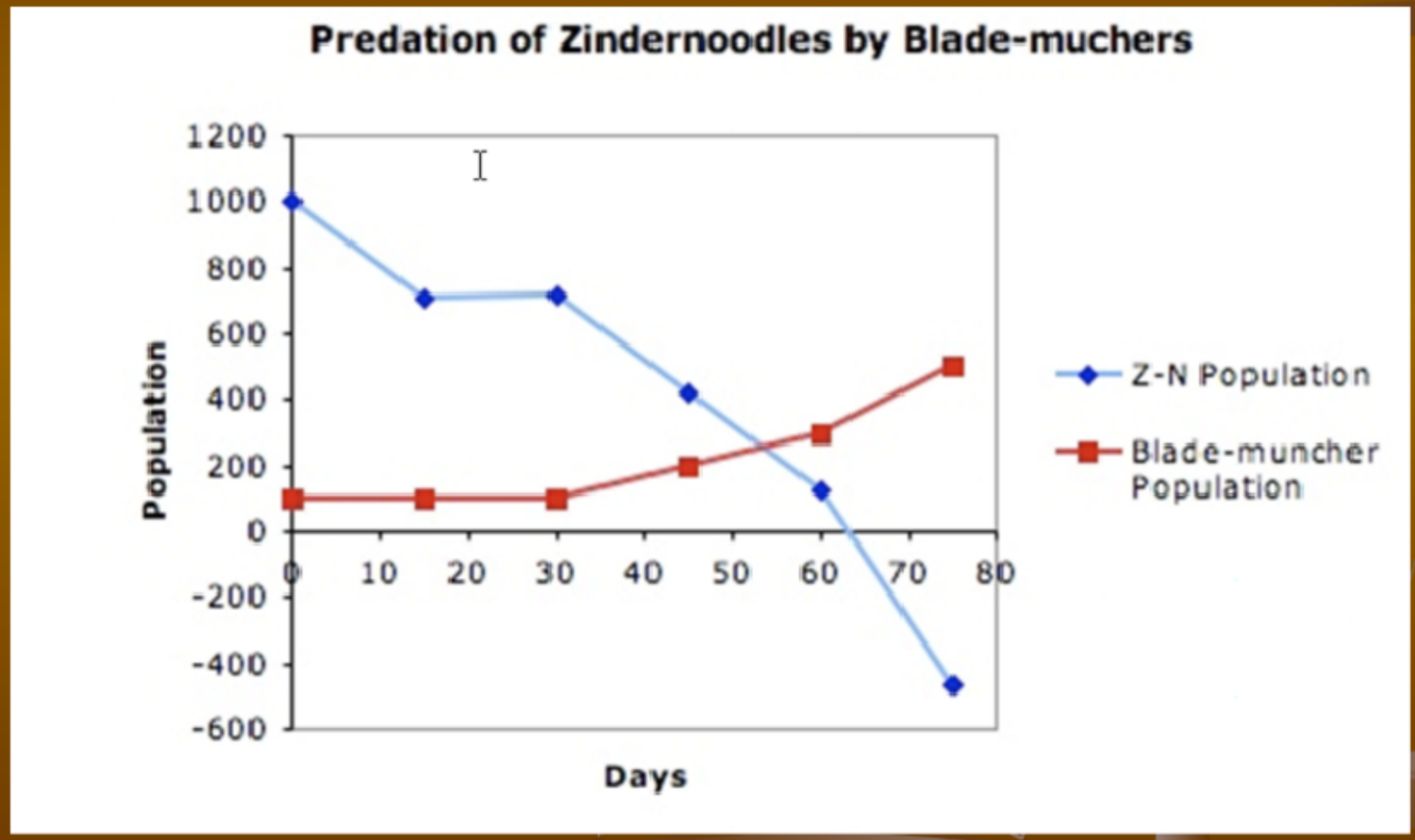
Blade-Muncher Consumption				
Day	P_0	P_1	P_2	Total Consumption
1	100	-	-	100
5	-	-	-	100
10	100	-	-	200
15	-	-	-	200
20	100	-	-	300
25	-	-	-	300
30	100	-	-	400
35	-	-	-	400
40	100	-	-	500
45	-	100	-	600
50	100	-	-	700
55	-	100	-	800
60	100	-	-	900
65	-	100	-	1000
70	100	-	-	1100
75	-	100	-	1200
80	100	-	-	1300
85	-	100	-	1400
90	100	-	200	1700
95	-	100		1800
100	100	-	200	2100

More Step Function behavior



Graph 2. Blade munchers per reproductive time-step.

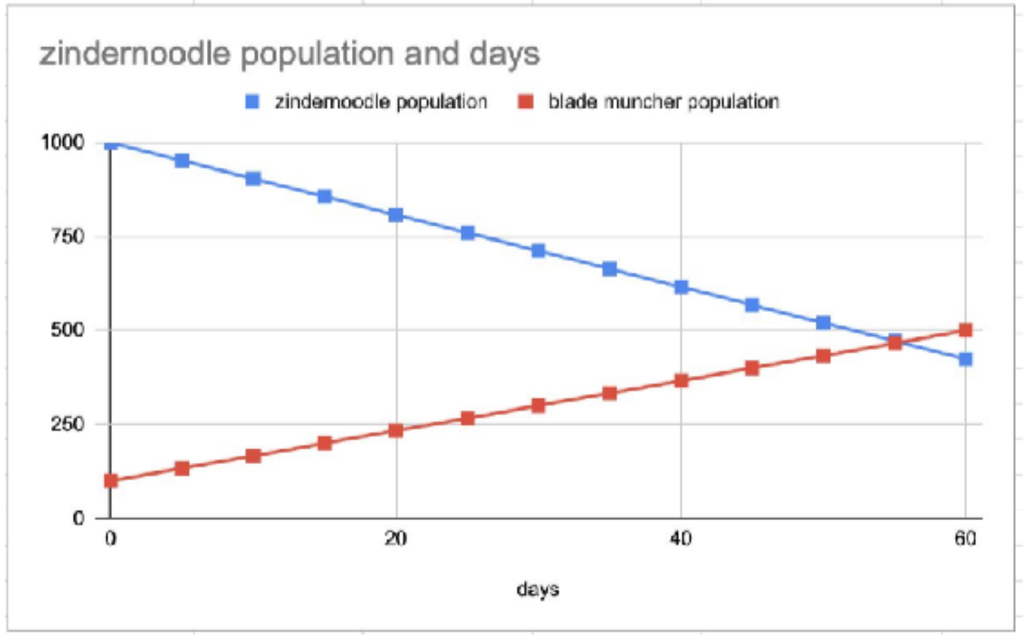
Graphically

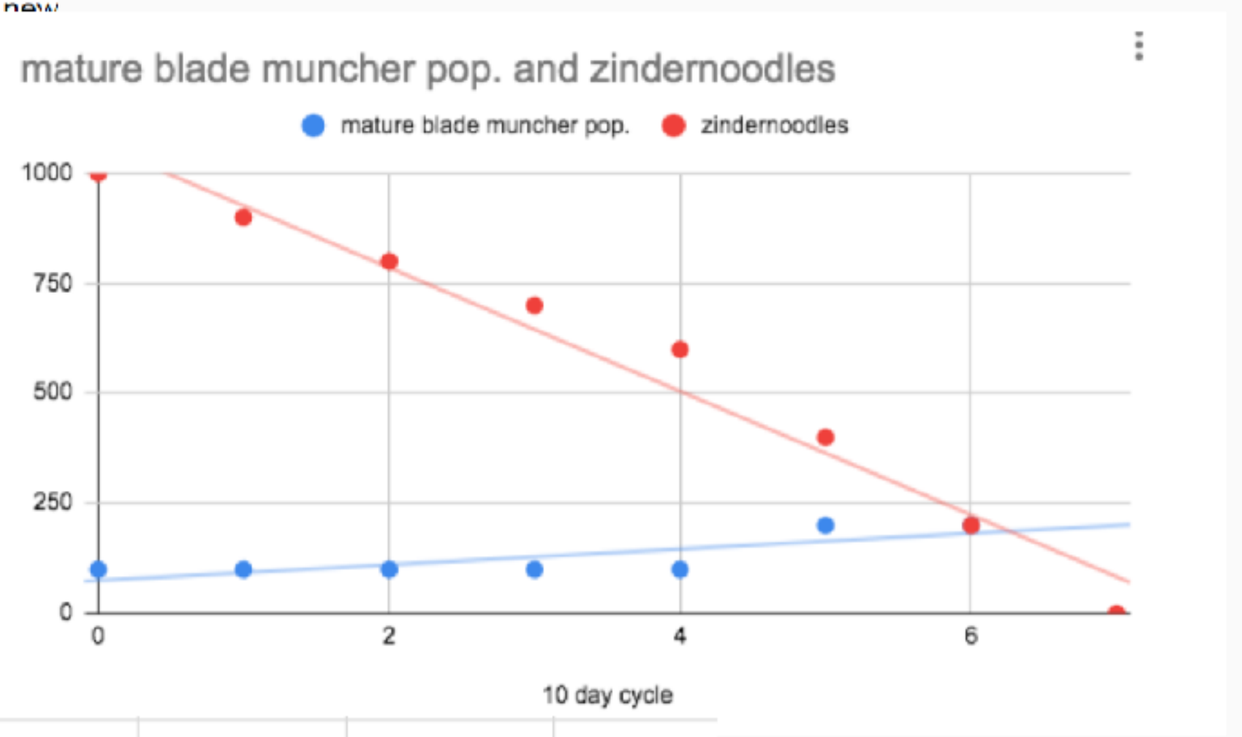


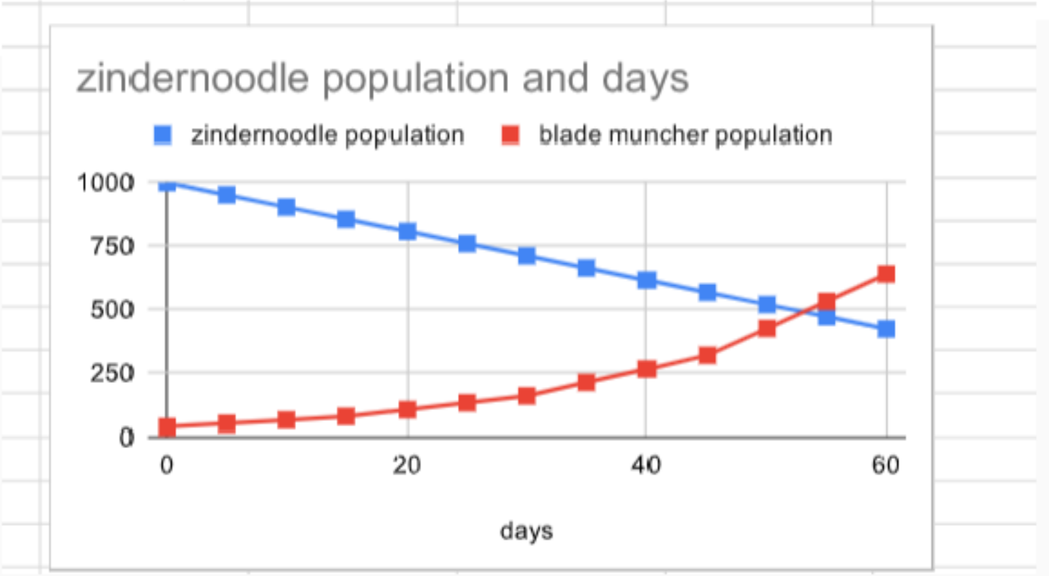
5. Two bladmunchers and their offspring will be able to consume all the zindernoodles within a 1000 day cycle, so there is no number that can coexist with zindernoodles long term. Starting with 2 initial blademunchers, the population of zindernoodles crashes after about 150 days.

days	zindernoodles	mature b-ms	z-n's eaten	net z-n's
0	1000	2	0	1000
5	1000	2	1	999
10	1004	2	2	1002
15	1004	2	3	1001
20	1008	2	4	1004
25	1008	2	5	1003
30	1012	2	6	1006
35	1012	2	7	1005
40	1016	2	8	1008
45	1016	4	18	998
50	1020	4	20	1000
55	1020	4	22	998
60	1024	8	48	976

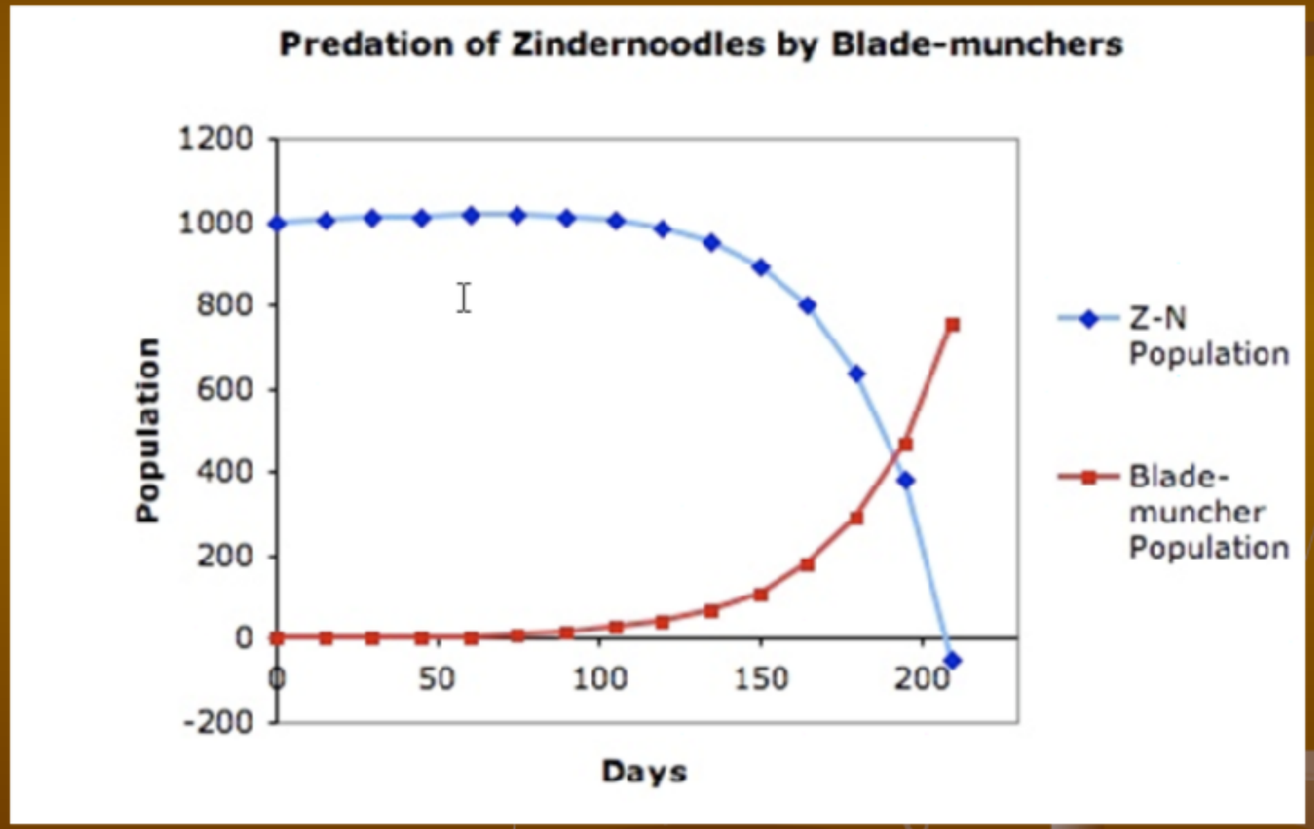
4. If 100 blade munchers were introduced into the population, the zindernoodles would
off faster, making it 100 or less days for them to actually survive. Not allowing for ne
zindernoodles to grow because they aren't getting the nutrients they need for a new
lifecycle.



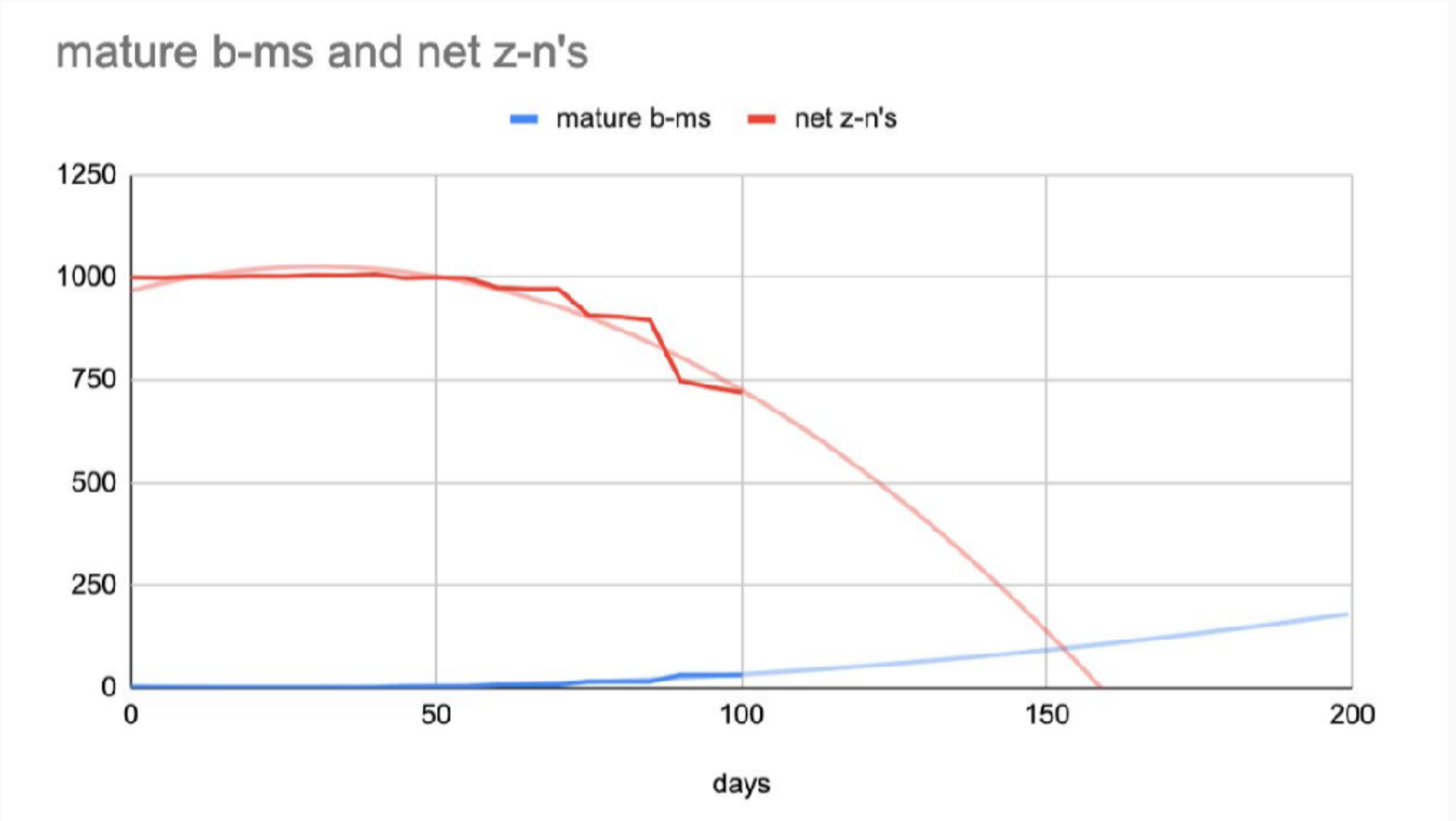




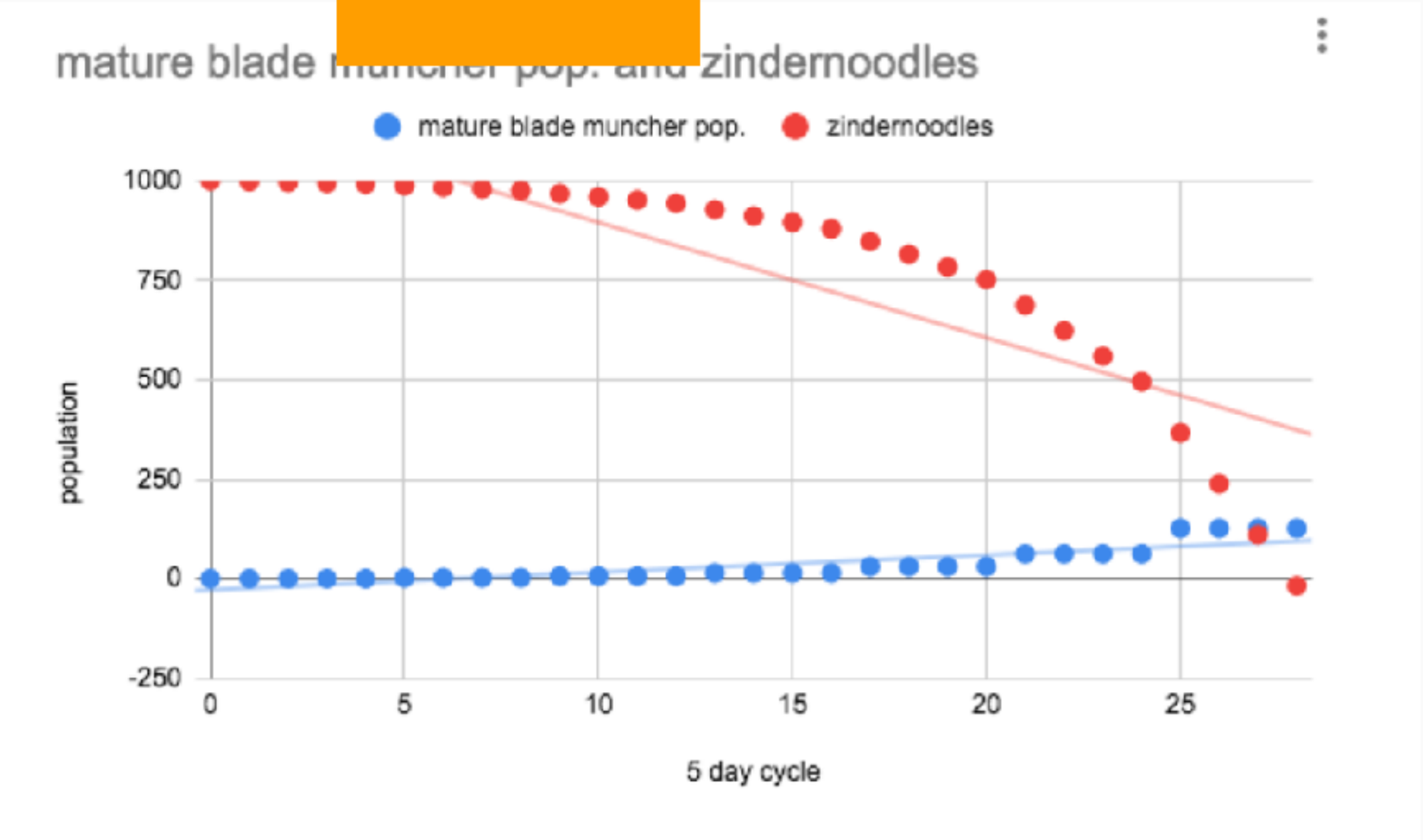
Graphically



Initial Population = 2; Still collapse it just takes a bit longer


mature b-ms and net z-n's
mature b-ms
net z-n's
1250
1000
750
500
250
0
0
50
100
150
200
days

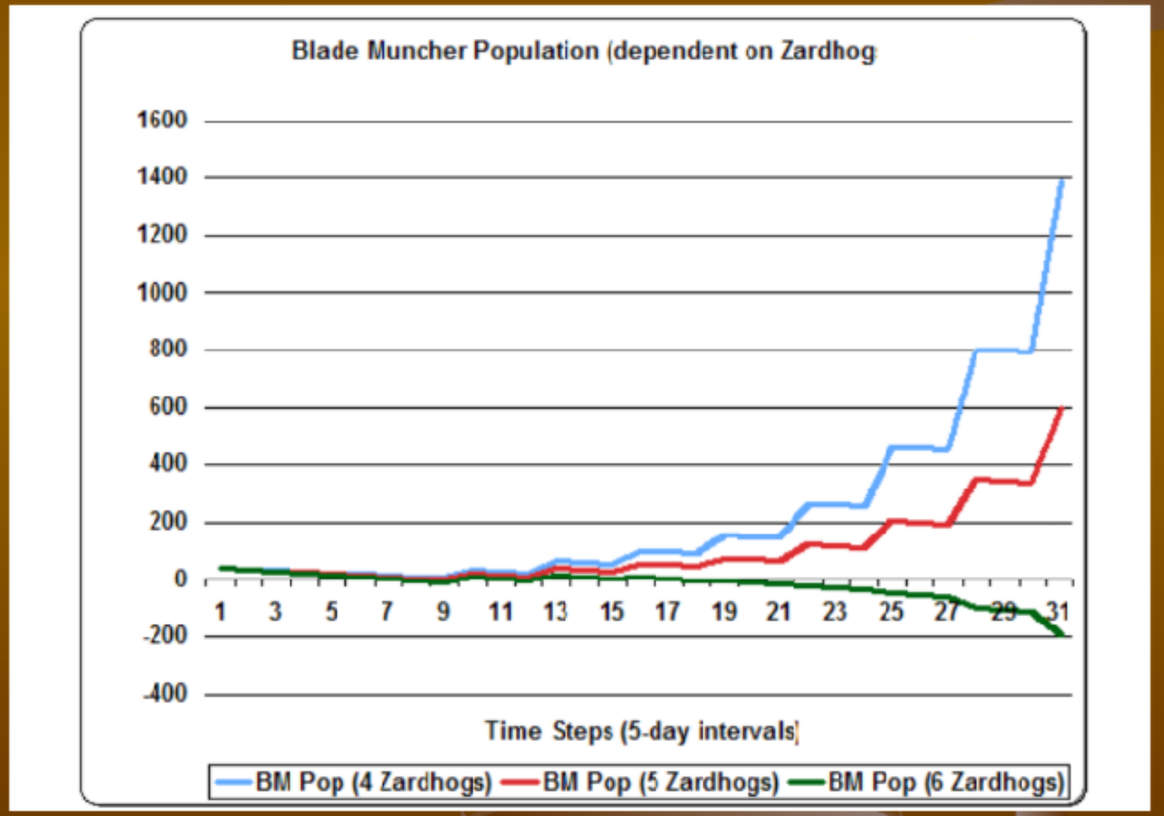
Lowering the Breeding cycle to 5 days of course makes the situation much worse



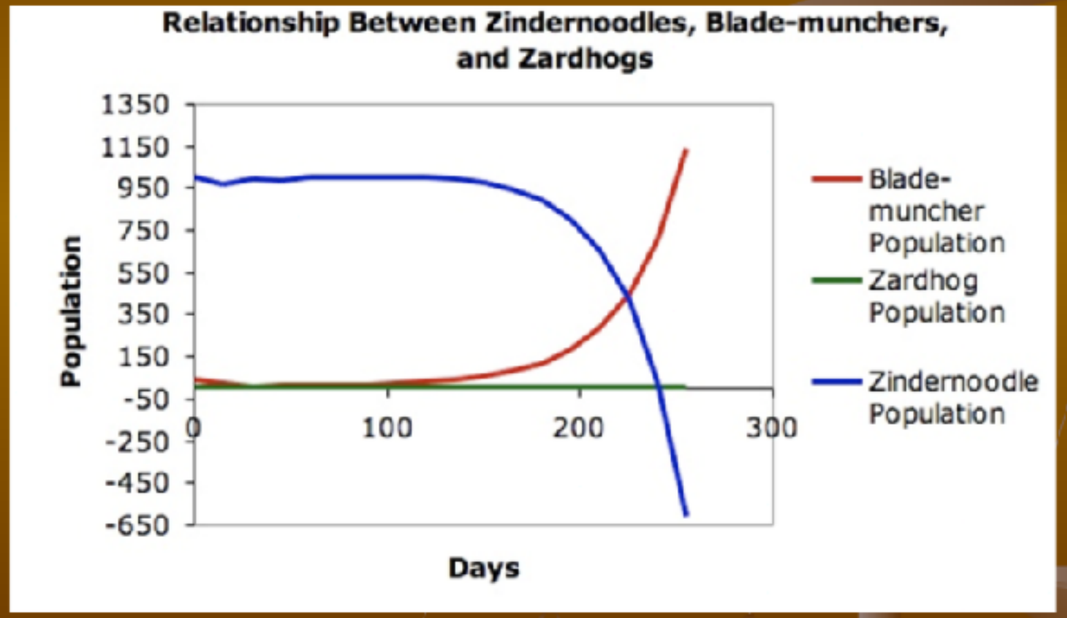
Fractional Predators Don't Exist

- When 4 zardhogs are introduced, the blade muncher population outgrows the influence of the zardhogs. With 5 zardhogs, the blade muncher population does not grow as quickly, but eventually outgrows the zardhogs control. When 6 zardhogs are introduced all of the blade munchers are consumed and the blade munchettes produced are not enough to replenish the population.

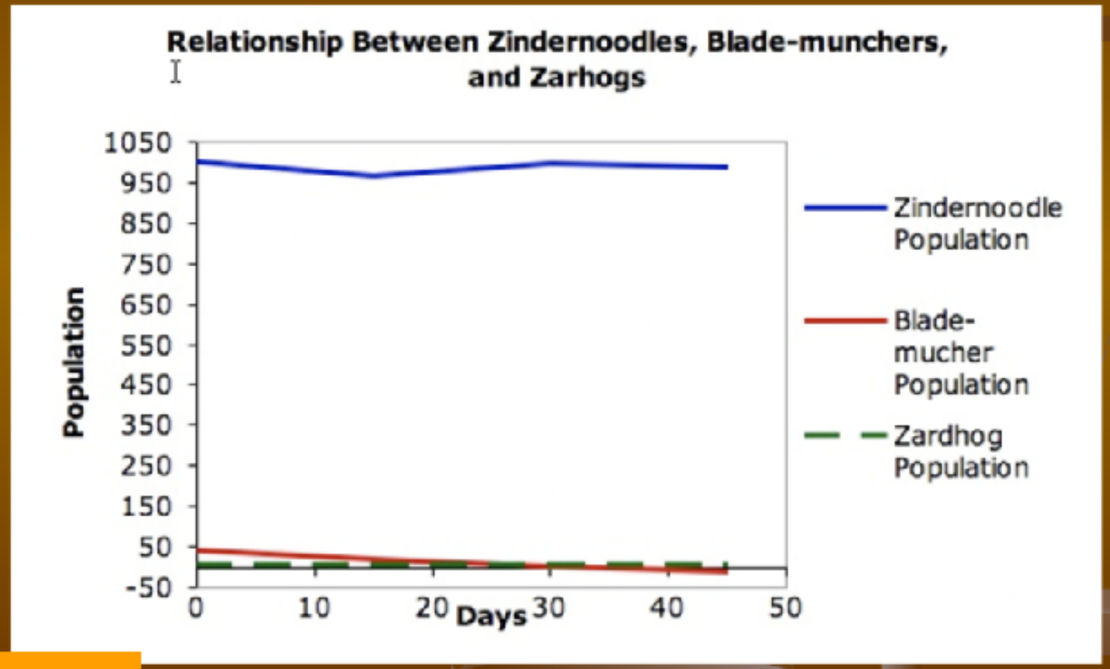
Graphically



Another Graph – 5 Zardhogs



6 Zardhogs

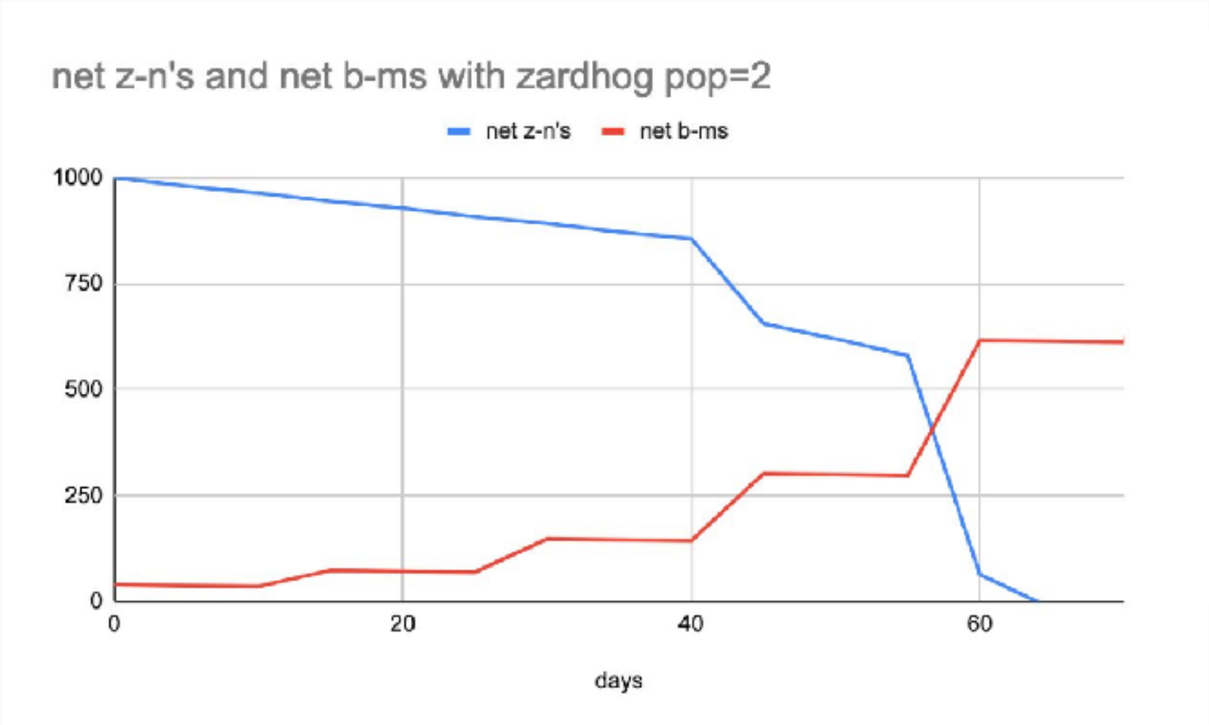


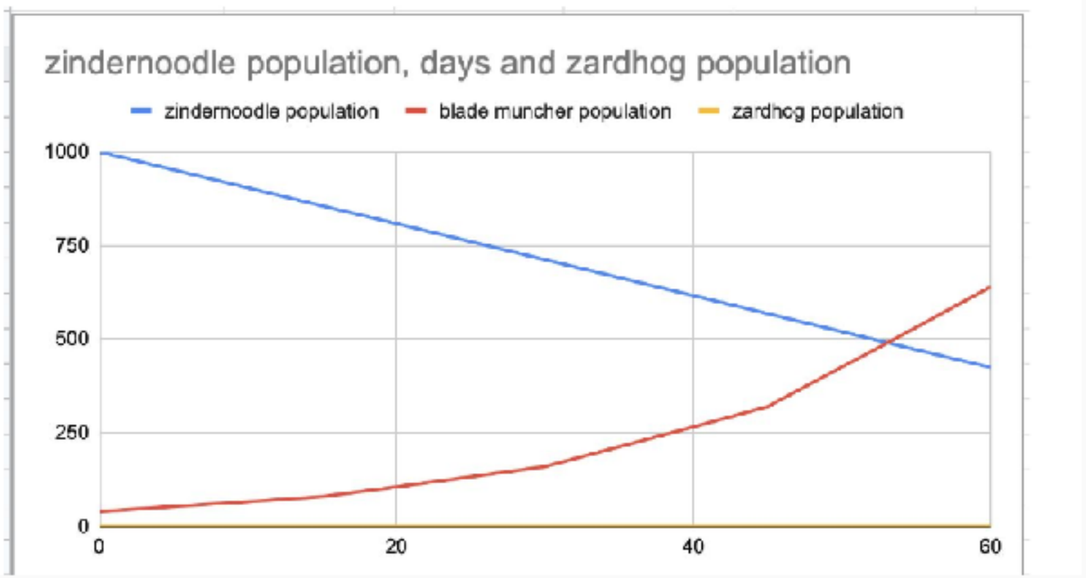
System behavior is completely dependent on the initial population of Zardhog Predator that is introduced

SunShine Moonbeam

- Zarhogs eat all the blade munchers by day 25 – faster than their reproductive scale

	Zardhog population	Blade Muncher Population	Munchette Population	Zindernoodle population
0	2	**10**	0	1000
5	2	8	0	
10	2	6	0	994
15	2	4	10	
20	2	2		992
25	2	0		
30	2	-2	14	994
35	2	-4		


net z-n's and net b-ms with zardhog pop=2
net z-n's
net b-ms
1000
750
500
250
0
0
20
40
60
days


zindernoodle population, days and zardhog population
zindernoodle population
blade muncher population
zardhog population
1000
750
500
250
0
0
20
40
60

Again, go back to the generic conditions (where the blade-muncher consumes 1 zinder-noodle every 10 days) but now we introduce the Zardhogs. These are fierce, smelly creatures that just love to eat blade-munchers but hate the taste of blade-munchettes so they have to wait until the little ones mature. A zardhog spends most of its time sleeping and generally consumes 1 blade-muncher every 5 days. Zardhogs have 1 off spring every 6 months (they would have more but they spend most of their time fighting since there are all married to one another). In addition, if the Zindernoodle density exceeds 20 per acre, that creates a toxic environment for the Zardhogs and they explode upon contact with a Zindernoodle. Of course, if the Zardhogs eat all the blade-munchers, they die of starvation. Life is tough as a Zardhog.

What is the basic reason in terms or timescale mis-matches than dominates the system so that no equilibrium can occur??