

# UNIT 6: Exploitation

# Outline

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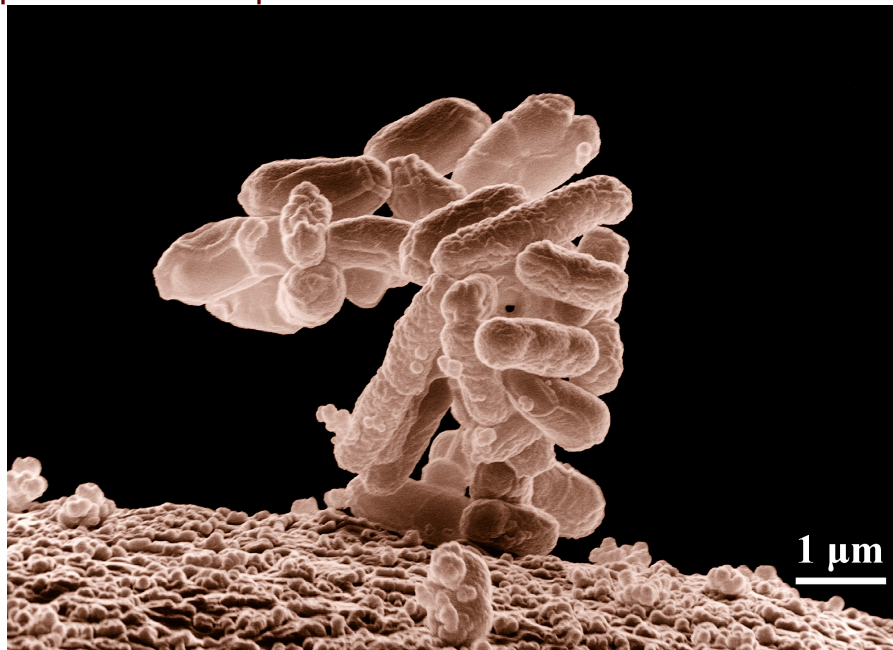


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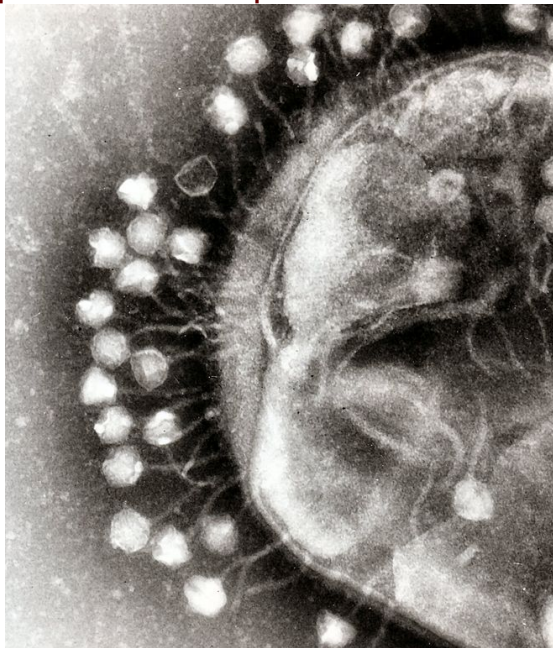




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## Subsection 1

### Balance and equilibrium

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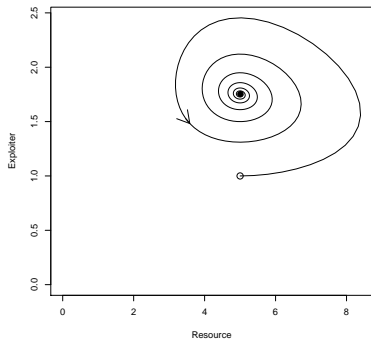
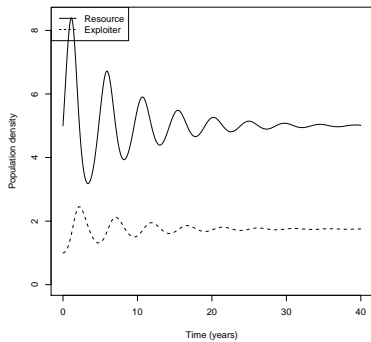
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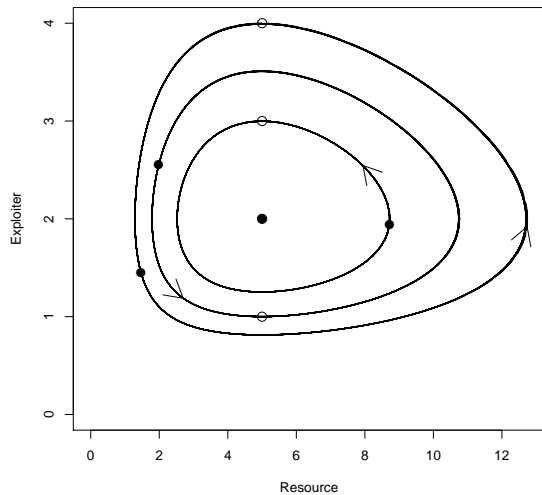
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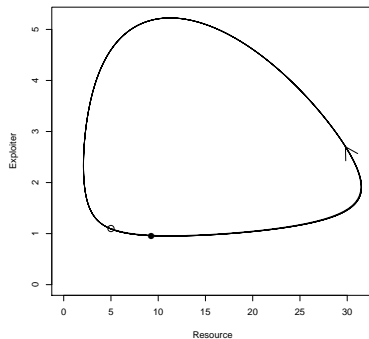
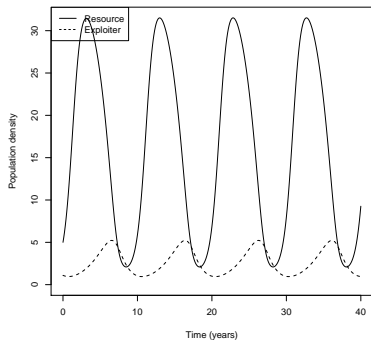
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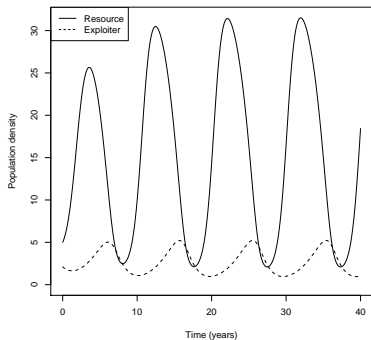
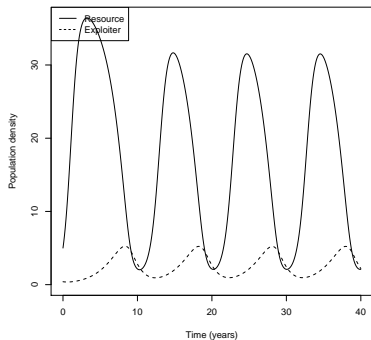
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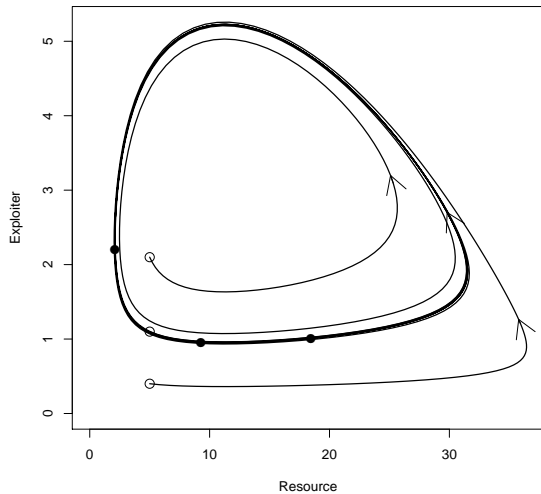
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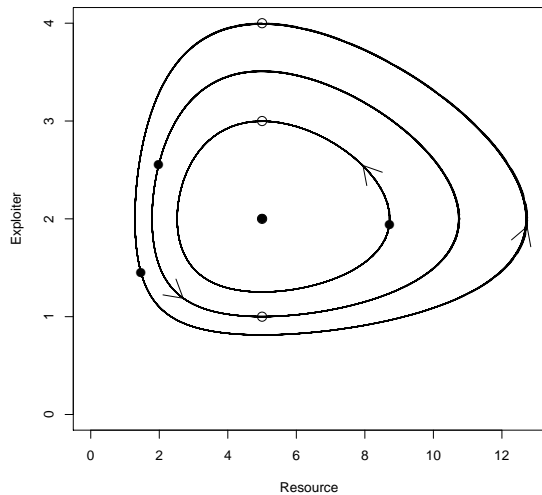
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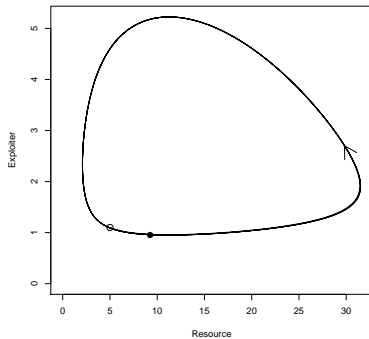
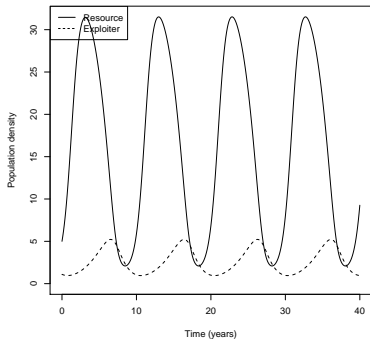
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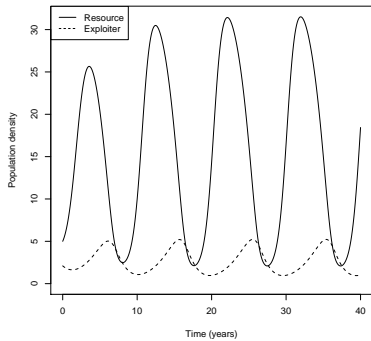
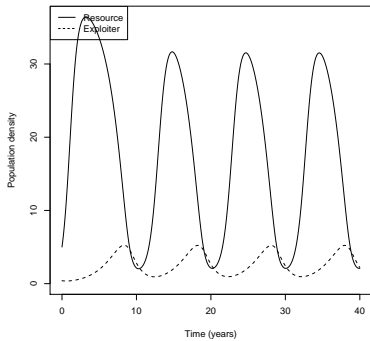
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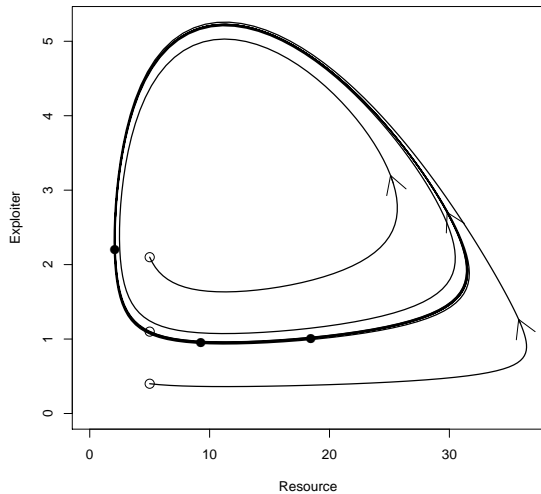
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## Subsection 1

More detailed models

# *How do populations affect their own growth rates?*



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## *People and the ocean*



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## Subsection 2

### More detailed models

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  - ▶  $\frac{dN_f}{dt} = r_f(N_e, N_f)N_f$
  - ▶  $\frac{dN_e}{dt} = r_e(N_f)N_e$
- ▶ What happens to the equilibrium if we start catching fish?
  - ▶ \*  $r_e$  doesn't change, so  $N_f$  can't change
  - ▶ \*  $r_f$  goes down and must be balanced by less sharks
- ▶ What if we start catching sharks?
  - ▶ \*  $r_e$  goes down, so  $N_f$  must go up
  - ▶ \* Increasing  $N_f$  could increase or decrease  $r_f$ , so  $N_e$  could go up or down!

## Subsection 3

Who controls whom?



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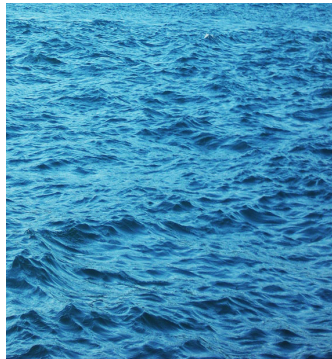
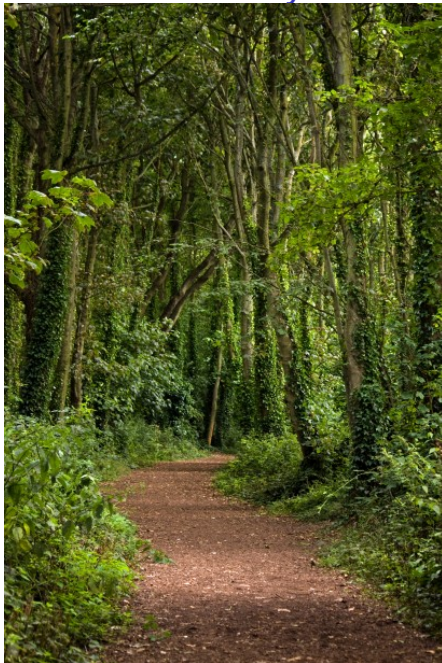
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# Outline

## Subsection 1

### Oscillation

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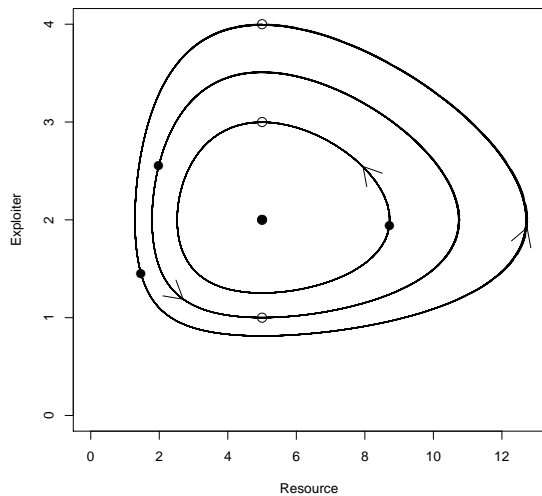
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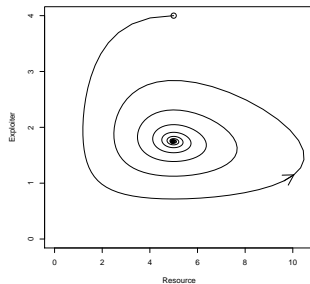
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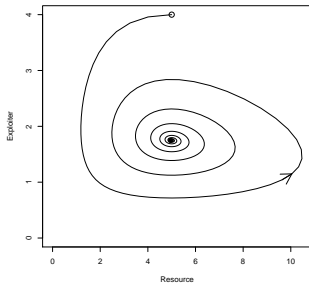
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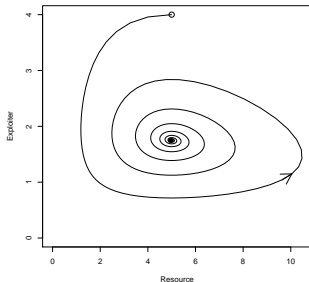
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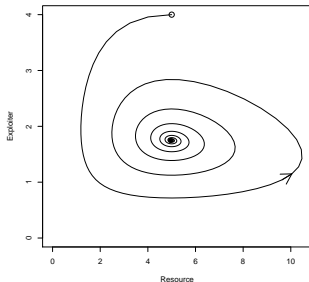
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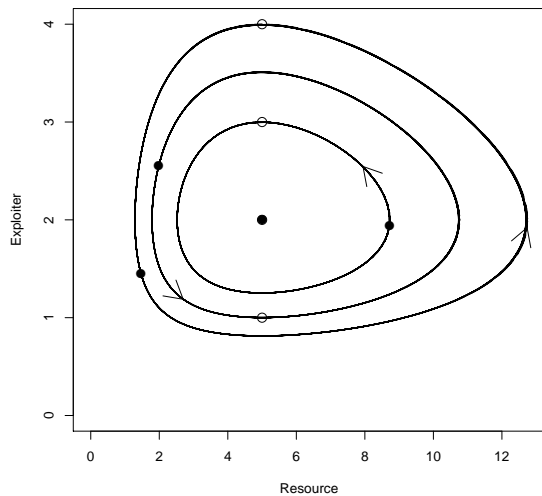


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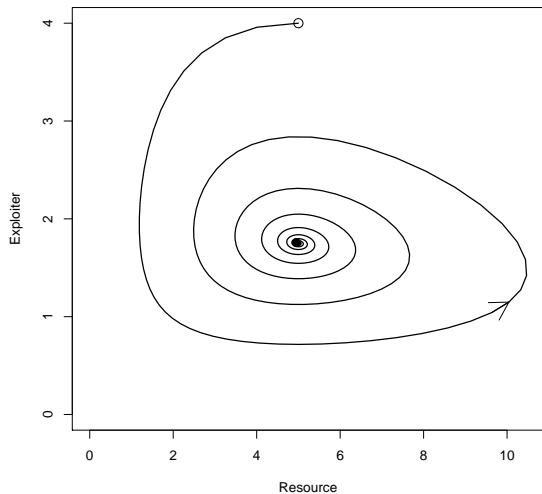
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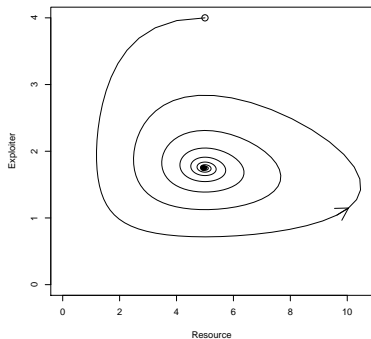
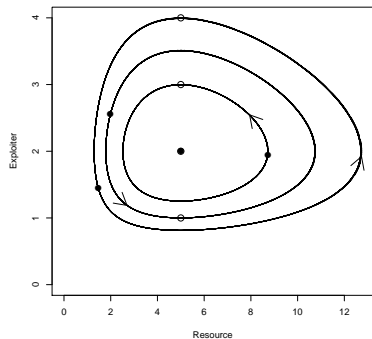
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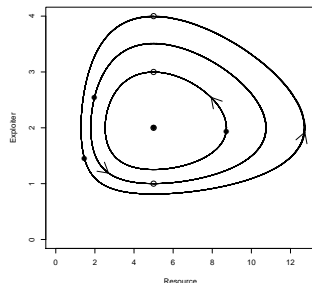


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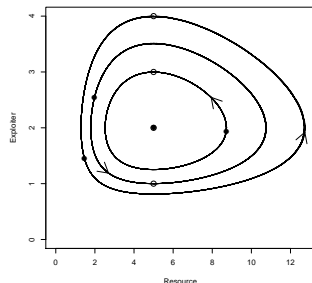
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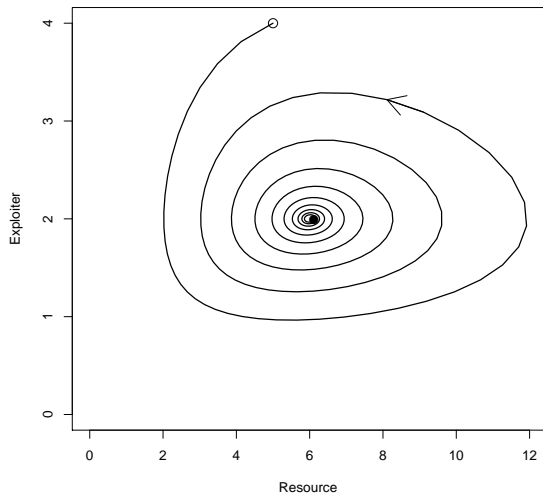


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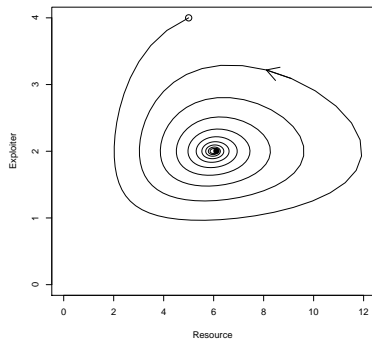
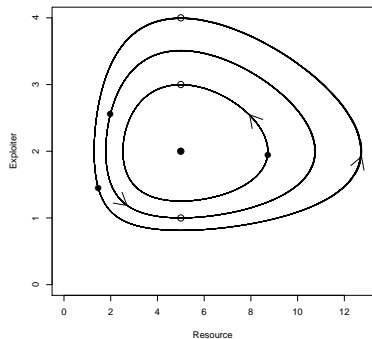


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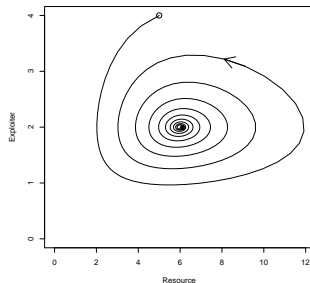


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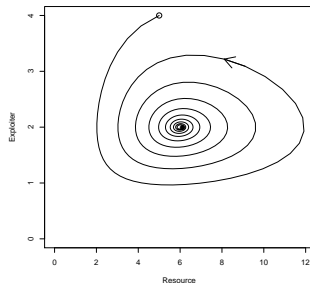
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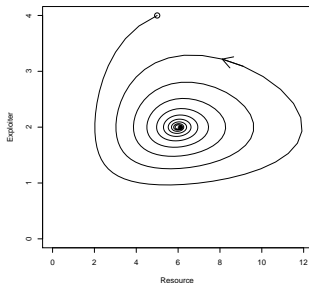
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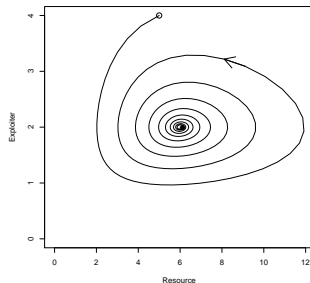
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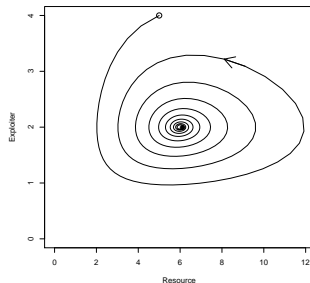
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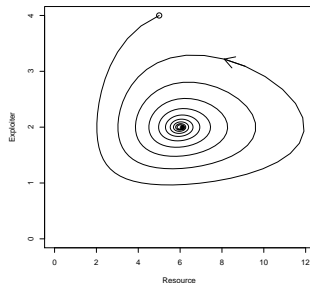
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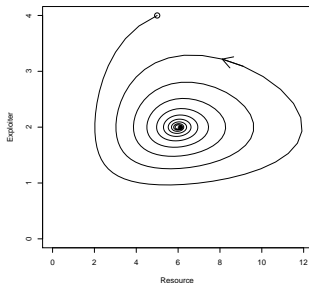
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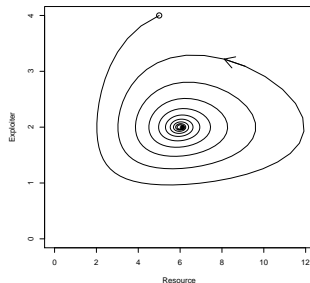
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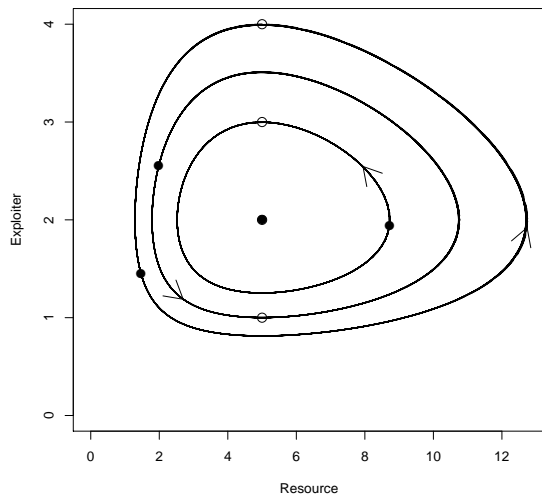
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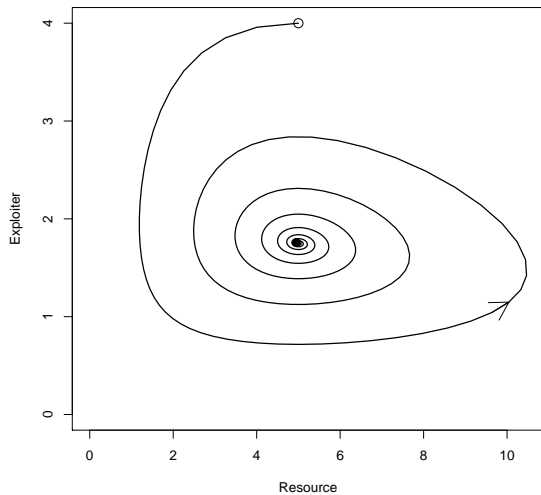
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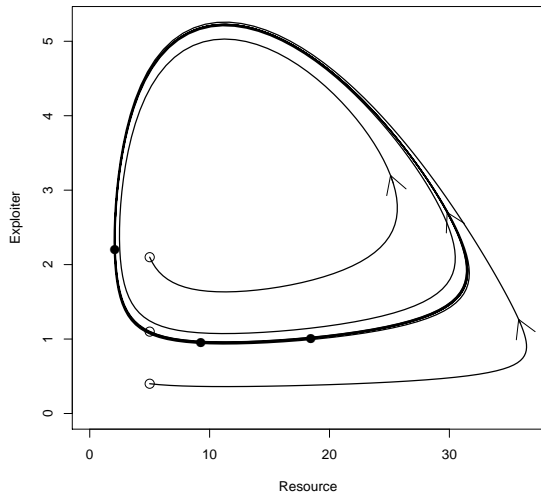


## *Prey density dependence*





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## Subsection 2

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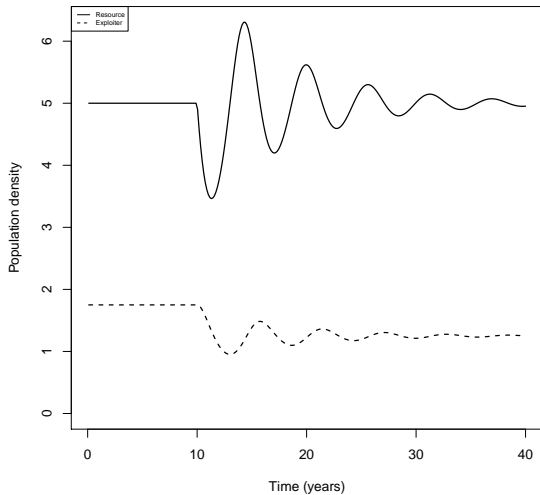
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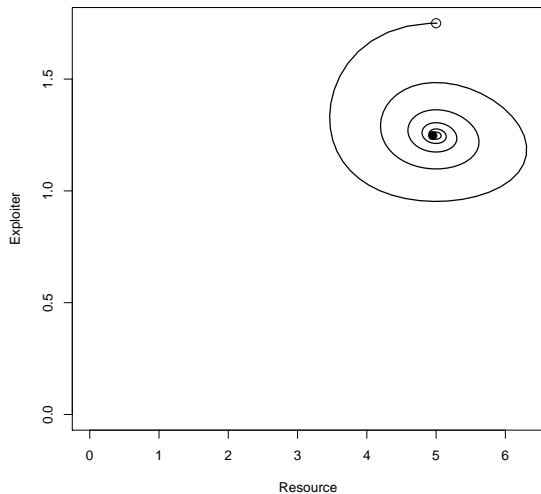
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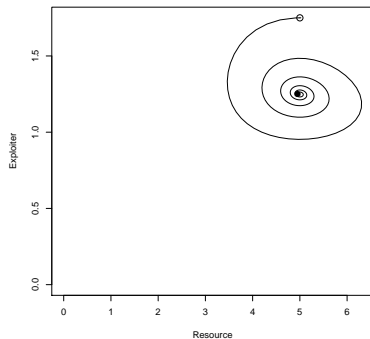
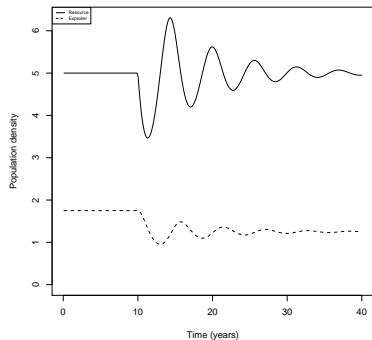
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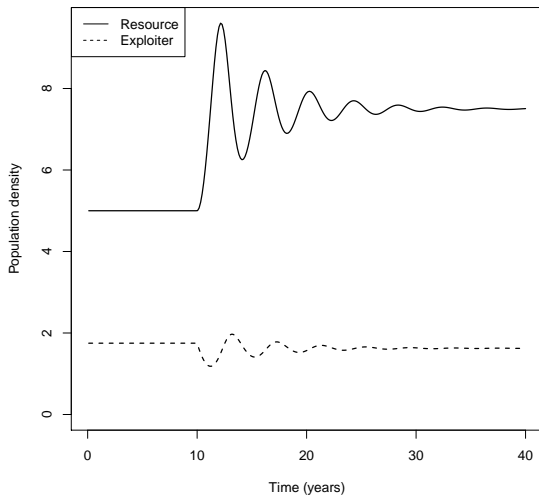
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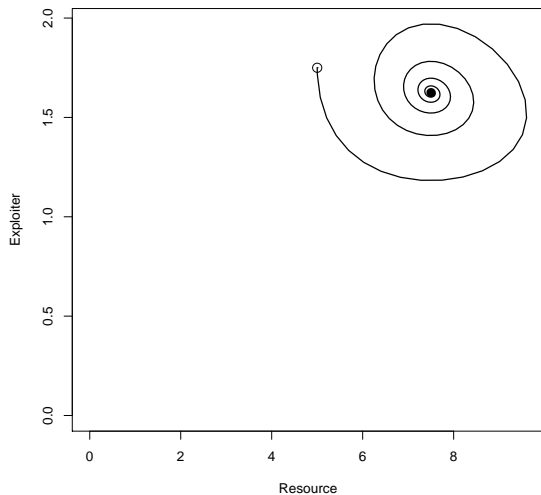
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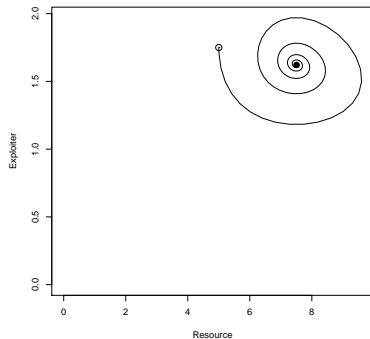
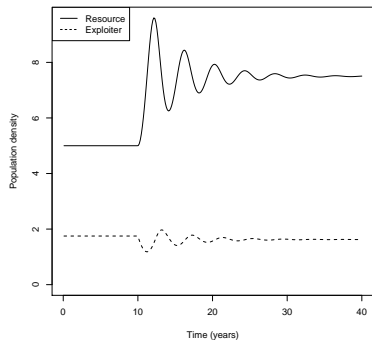


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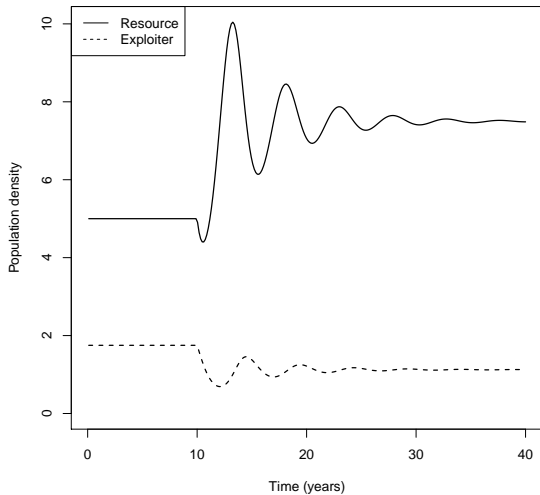




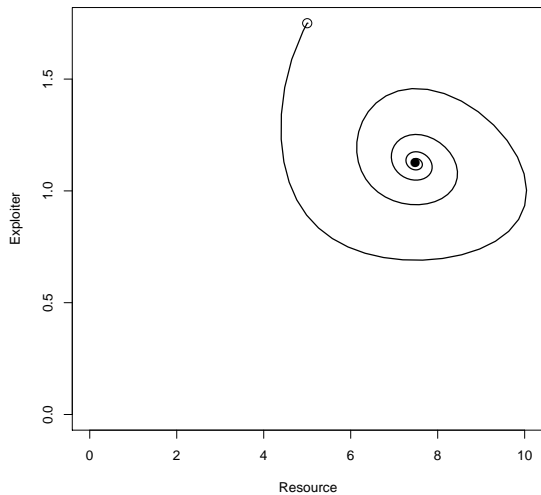
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