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NPTEL

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Courses » **Introduction to Evolutionary Dynamics**

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Unit 8 - Week 7

Course outline

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○ Lecture 31 : Evolutionary Dynamics when Mutations are Rapid – 1

○ Lecture 32 : Evolutionary Dynamics when Mutations are Rapid – 2

○ Lecture 33 : Evolutionary Dynamics when Mutations are Rapid – 3

○ Lecture 34 : Evolutionary Game Theory – 1

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Week 8

Week 7 Assessment

The due date for submitting this assignment has passed. **Due on 2017-09-13, 23:59 IST.**
As per our records you have not submitted this assignment.

1) When mutations are rapid, which of the following statements are true at steady state: *1 point*

☐ The steady state distribution of mutants with different fitness resemble a bell-shaped curve.

☐ Fitter new mutants increase and less fit mutants decrease in number, both at similar absolute rates.

☐ Average waiting for new mutants to establish is lower than the case when mutations are rare.

☐ Many mutants get fixed.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Fitter new mutants increase and less fit mutants decrease in number, both at similar absolute rates.
The steady state distribution of mutants with different fitness resemble a bell-shaped curve.
Average waiting for new mutants to establish is lower than the case when mutations are rare.

2) If a mutant emerges in a bacterial population that does not produce the public goods, then its *1 point* relative fitness compared to others in the population is:

○ Slightly deleterious
○ Neutral
○ Beneficial
○ Deleterious

No, the answer is incorrect.
Score: 0

Accepted Answers:
Beneficial

3) In a population that does not produce public goods, if a new mutant produces public goods, *1 point* what will be the effect on the fitness of the population?

○ Neutral
○ Deleterious
○ Slightly deleterious
○ Beneficial

No, the answer is incorrect.
Score: 0

Accepted Answers:
Beneficial

4) If the fitness of two genotypes A and B are equal at a certain population composition $\bar{x}$,   *1 point* $f_A(\bar{x}) = f_B(\bar{x})$, it implies:

    ○ Genotype B will overtake the population
    ○ Genotype A will overtake the population
    ○ The population is at steady state
    ○ The population is about to collapse

No, the answer is incorrect.
Score: 0

Accepted Answers:
The population is at steady state

5) In a rapidly evolving population, the number of phenotypes coexisting in the environment at a *1 point* given time is:

    ○ > 2
    ○ Two
    ○ Zero
    ○ One

No, the answer is incorrect.
Score: 0

Accepted Answers:
> 2

6) Speed of evolution is dictated by: *1 point*

    ☐ Deleterious mutation rate
    ☐ Beneficial mutation rate
    ☐ Neutral mutation rate
    ☐ N (population size)

No, the answer is incorrect.
Score: 0

Accepted Answers:
N (population size)
Beneficial mutation rate

7) Increasing the beneficial mutation rate will   *1 point*

    ○ Increase the speed of evolution
    ○ Have no effect on speed of evolution
    ○ Decrease the speed of evolution
    ○ None of the choices.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Increase the speed of evolution

8) At a given time, the frequency distribution of the phenotypes in a traveling wave are as   *1 point* follows:

Genotype	Relative Fitness	Frequency
A	-2	0.1
B	-1	0.2
C	0	0.3
D	1	0.2
E	2	0.1

Choose True statements.

☐ Frequency of A decreases

☐ At this instant, frequency of C does not change

☐ Frequency of B increases

☐ Frequency of D increases

No, the answer is incorrect.
Score: 0

Accepted Answers:
At this instant, frequency of C does not change
Frequency of D increases
Frequency of A decreases

9) In the above question, the mean fitness of the population is: *1 point*

○ 0

○ 1

○ 2

○ -1

No, the answer is incorrect.
Score: 0

Accepted Answers:
0

10)In the framework of rapid mutations, the speed of evolution is dictated by which of the   *1 point*
following:

○ Rate of deleterious mutations

○ Rate of neutral mutations

○ All of the choices.

○ The number of individuals in the leading edge

No, the answer is incorrect.
Score: 0

Accepted Answers:
The number of individuals in the leading edge

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