Bakı Dövlət Universiteti

Biologiya fakültəsi; Qrup: 127E; Fənn: Ecological genetics

İmtahan sualları

(2021-ci il, tədris yükü (saat) cəmi: 90 saat; mühazirə 45 saat; məşğələ 45 saat)

1. The subject of Ecological genetics, its main problems
2. The theoretical and practical problems of Ecological genetics
3. Brief history of Ecological genetics
4. The investigation methods of Ecological genetics
5. Conception of adaptation, adaptive reaction norm
6. The role of modifications and genotypic variations in adaptation
7. Different types of adaptations
8. Ontogenetic and phylogenetic adaptations
9. Population-species adaptations and adaptations in biogeocenosis
10. Adaptive traits of biological systems: plasticity, flexibility, stability, homeostasis, genetic homeostasis and canalization
11. Genetic diversity, its types; significance of conservation of genetic diversity
12. Genetic erosion, its causes and results
13. Genetic effects of population fragmentation, population size, inbreeding and gene flow
14. Population bottleneck and fonder effect
15. Conservation methods of genetic diversity
16. Evolution as a consequence of changes in alleles and allele frequencies in populations over time
17. Factors affecting allele frequencies and genetic equilibrium in populations
18. Genetic nature of adaptive reactions
19. Role of heterozygosity and polymorphism in adaptation
20. Explaining the high level of genetic variation in populations
21. Detecting genetic variation by artificial selection and genetic markers
22. Polymerase chain reaction (PCR); its steps, limits, types and applications
23. Integration of adaptive reactions
24. Role of supergenes and gene-complexes in adaptation
25. Heterostyly, its role in adaptation
26. Genetic regulation mechanisms of adaptive traits
27. Effects of environmental factors on gene expression in prokaryotes; the operon model of regulation
28. Positive and negative inducible mechanisms of regulation of gene activity in prokaryotes
29. Positive and negative repressible mechanisms of regulation of gene activity in prokaryotes
30. CAP and catabolite repression of *lac* operon
31. Regulation of gene expression in eukaryotes

32. Corresponding regulation of gene expression
33. Role of chromatin structure in genetic regulation of gene activity and adaptation
34. Regulation of transcription in eukaryotes; role of enhancers and silencers in regulation of gene expression
35. Role of mobile elements in regulation of gene expression
36. Functional regulation of gene activity; heat shock proteins (HSPs)
37. Heterogeneous nature of eukaryotic genes; the role of processing in regulation of gene activity in eukaryotes
38. Evolution of genome size
39. Structure of eukaryotic genome
40. Redundancy of eukaryotic genomes and its role in adaptatiogenesis
41. Adaptatiogenesis of genetic systems
42. Symbiogenesis; endosymbiosis theory of mitochondria's and chloroplasts
43. The types of biological variability and their role in adaptations
44. The study of polygenic traits on the base of statistical analysis
45. Heritability values which estimate genetic contribution to phenotypic variability
46. Broad-sense and narrow-sense heritability's
47. The main types of mutations, their role in adaptation and evolution
48. Point mutations and their role in adaptations
49. Spontaneous and induced mutations and their role in adaptation
50. Molecular bases of mutagenesis
51. Environmental mutagens and their effect on genetic systems
52. Genetic anticipation; mutations caused by expandable DNA repeats
53. Mobile genetic elements, mutations and evolution
54. Protection mechanisms of genome from mutagens
55. Role of reparation systems in protection of genome
56. Excision and mismatch repair mechanisms of prokaryotic genomes
57. Base and nucleotide excision repair mechanisms prokaryotes and eukaryotes
58. Direct repair mechanisms of DNA damages; significance of post-replication repair and SOS-prone in adaptation
59. Genetic predisposition and susceptibility; environmental triggers
60. The main principles and achievements of genetic engineering; concerns about genetically modified organisms and GM foods

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