IAS Mains Agriculture 2000

Paper-II

Section A

1. Answer any three of the following in about 200 words each:

    a. What were the reasons for Mendel's success in his genetic experiments? Explain how Mendelian inheritance differs from cytoplasmic inheritance.

    b. What are different components of variation in a plant population? How do you calculate how heritability using variance components? Explain how heritable variation can be created artificially.

    c. Explain with the help of a flow chart how backcross method of breeding can be used for transfer of disease resistance controlled by a dominant gene. List the merits and limitations of backcross method of breeding.

    d. Describe the part played by chlorophyll, carbon dioxide and light in the synthesis of carbohydrates

2. Answer the following questions

    a. Describe the climatic and soil requirements for 'be nana' cultivation. Mention the names of popular varieties of banana. Explain how planting material is prepared for banana cultivation.

    b. Describe salient features of 'transcription' and 'translation' in protein synthesis.

    c. Describe briefly the biological methods of pest control in agricultural and horticultural crops with suitable examples.

3. Write short notes on the following:

    i. Paracentric inversion

    ii. Bio-pesticides

    iii. Vernalization

    iv. Molecular marker approach in plant breeding

4. Answer the following questions

    a. Explain the significance of vegetables in human nutrition with suitable examples.

    b. What is sex-linked inheritance? How does it differ from Mendelian inheritance? Explain sex determination in Drosophila.

    c. Write about the causative organisms, symptoms of damage and chemical control of the

following diseases:

    i. Dieback in citrus

    ii. Damping off in cauliflower

    iii. Sooty mould in mango

iv. Anthracnose in grapes

Section B

5. Answer any three of the following in about 200 words each:

    a. Distinguish between intra-and inter-specific hybridization. Explain the barriers encountered during inter-specific hybridization and methods to overcome them.

    b. Differentiate between macro and micro-mutations. Explain the role of mutations in crop improvement with appropriate examples.

    c. What are auxins? Give their mode of action and explain their importance with reference to horticulture in India.

    d. Describe with suitable diagrams the events and their significance during interphase, prophase and metaphase stages of Meiosis-I.

6. Answer the following questions

    a. What arc the factors contributing to low production of Fruits in India V What measures are necessary to increase their production and productivity?

    b. Describe the management of the following crop pests:

        i. Fruitfly in mango

        ii. Fruit borer in tomato

        iii. Red hairy caterpillar in groundnut

        iv. Stem borer in sugarcane

7. Answer the following questions

    a. What are the importance diseases of paddy? Name, the causative organisms of these diseases. Give the management schedule of these diseases.

    b. Distinguish incompatibility from sterility. Give classification of incompatibility. Explain the significance of incompatibility in plant breeding with relevant examples.

    c. Define germplasm. How do you maintain germplasm? List donor genetic resources for various traits being used for developing the new plant type in rice.

8. Write brief notes on the following

    i. Sex-limited characters

    ii. Combining ability

    iii. Phytoalexins

    iv. Non-aerobic respiration