Parasitic Adaptations of Plants – Cuscuta (Dodder)

3-Marks Questions (Short Answer Type)

Q: Define parasitic plants and give one example. (Remembering)
Ans: Parasitic plants are plants that depend wholly or partly on other living plants (hosts) for nutrition. Example: Cuscuta (dodder).

Q: What are haustoria? Mention their role in Cuscuta. (Understanding)
Ans: Haustoria are specialized absorbing organs that penetrate the host tissues and connect with xylem and phloem to absorb water, minerals, and organic food.

Q: Why does Cuscuta lack leaves and chlorophyll? (Understanding)
Ans: Cuscuta lacks leaves and chlorophyll because it is a total stem parasite, fully dependent on its host for carbohydrates and photosynthates.

Q: State one function of the twining habit in Cuscuta. (Applying)
Ans: The twining habit helps Cuscuta coil around the host plant, providing mechanical support and facilitating maximum haustorial contact.

Q: What happens to the primary root of Cuscuta seedlings? (Remembering)
Ans: The primary root of Cuscuta is short-lived and soon replaced by haustorial attachments to the host.

Q: Mention one reproductive adaptation that ensures Cuscuta's survival in nature. (Understanding)
Ans: Cuscuta produces seeds with hard, impermeable coats that allow long dormancy, ensuring survival in unfavorable conditions.

Q: How does Cuscuta locate its host plant? (Applying)
Ans: Cuscuta locates its host plant by rapid elongation of its stem and by sensing chemical cues (volatile compounds) released by the host.

6-Marks Questions (Short Essay Type)

Q: Explain the structural adaptations of Cuscuta that support its parasitic habit. (Understanding)
Ans: Cuscuta shows adaptations like haustoria for host penetration, reduced or absent leaves, yellow chlorophyll-less twining stems, weak or absent roots, and rapid growth towards hosts.

Q: Discuss the role of haustoria in both anchorage and nutrition of Cuscuta. (Analyzing)
Ans: Haustoria anchor Cuscuta firmly to the host plant and simultaneously connect with xylem and phloem to absorb water, minerals, and food for nutrition.

Q: Describe the reproductive adaptations of Cuscuta that ensure its success as a parasite. (Understanding)
Ans: Cuscuta produces numerous small flowers, often self-pollinated or cross-pollinated, and abundant seeds with hard coats that ensure dormancy and wide dispersal.

Q: Compare the root system of a normal autotrophic plant with that of Cuscuta. (Analyzing)
Ans: Autotrophic plants have well-developed root systems for absorption and anchorage. In Cuscuta, the root is short-lived, replaced by haustoria, indicating complete host dependence.

Q: How do physiological and structural features together ensure complete host dependence in Cuscuta? (Applying)
Ans: Structural features like haustoria, reduced leaves, twining stems, and weak roots combined with physiological features like absence of photosynthesis make Cuscuta fully dependent on the host.

10-Marks Questions (Essay Type)

Q: Describe in detail the morphological, anatomical, physiological, and reproductive adaptations of Cuscuta that make it a successful stem parasite. (Analyzing)
Ans: Morphologically, Cuscuta has thin, yellow twining stems and reduced leaves. Anatomically, it develops haustoria that penetrate host tissues. Physiologically, it lacks chlorophyll and relies on host xylem and phloem. Reproductively, it produces abundant seeds with hard coats, ensuring survival and spread.

Q: “The survival of Cuscuta is based on extreme reduction of its own structures and complete dependence on the host.” Evaluate this statement with suitable examples. (Evaluating)
Ans: Cuscuta shows extreme reduction in leaves, roots, and chlorophyll, eliminating its ability to photosynthesize or absorb nutrients from the soil. Instead, it relies entirely on the host via haustoria for survival, proving its adaptation is based on reduced structures and full host dependence.