Crop Protection Reviewer Based On TOS

Module D: Weeds & Module E: Invasive Species | Agriculture Review

Practice Questions (1 - 9)

1. Which physiological trait best enables a plant species to exhibit 'weediness' in heavily disturbed agricultural ecosystems?

- **a.** Requirement for highly specific insect pollinators for reproduction
- **b.** Ability to reproduce both sexually and vegetatively with high phenotypic plasticity
- **c.** Synchronized seed germination requiring absolute dark conditions
- **d.** Slow initial seedling vigor combined with a long vegetative phase

2. In contrast to domesticated crops, agricultural weeds typically exhibit which ecological characteristic?

- **a.** High degree of seed dormancy and asynchronous germination
- **b.** Low phenotypic plasticity across varying environmental conditions
- **c.** Strict autotrophy without any allelopathic capabilities
- **d.** Complete reliance on human intervention for seed dispersal

3. What is the primary ecological role that weeds play when they rapidly colonize a newly plowed field before the main crop is established?

- **a.** Secondary consumers in the soil food web
- **b.** Pioneer species that capture resources but heavily compete with subsequent crops
- **c.** Primary succession climax species stabilizing the ecosystem
- **d.** Obligate parasites relying entirely on host root exudates

4. Which anatomical feature is often shared by both perennial weeds and certain agricultural pests to ensure survival during adverse environmental conditions?

- **a.** Presence of diapause, aestivation, or profound dormancy mechanisms
- **b.** Lack of protective cuticles leading to rapid desiccation
- **c.** Continuous and uninterrupted growth cycles regardless of climate
- **d.** Complete inability to store carbohydrates in subterranean structures

5. A fundamental difference between a weed and a cultivated crop lies in their resource allocation strategy. Weeds predominantly allocate their biomass towards:

- **a.** Developing large, nutrient-dense edible sink organs
- **b.** Maximizing root-to-shoot ratios for deep water extraction exclusively
- **c.** Rapid vegetative expansion and producing high quantities of viable propagules
- **d.** Producing large fleshy fruits to attract human gatherers

6. Based on morphological characteristics, which structural feature reliably distinguishes grassy weeds from sedges in a field setting?

- **a.** Sedges have solid triangular stems while grasses have hollow cylindrical stems
- **b.** Sedges exhibit parallel venation while grasses exhibit netted venation
- **c.** Sedges possess prominent ligules and auricles which are absent in grasses
- **d.** Sedges have prominent taproots while grasses have strictly fibrous roots

7. Which weed species is appropriately matched with its morphological classification and photosynthetic pathway?

- **a.** Cyperus rotundus - Broadleaf weed - C3
- **b.** Echinochloa crus-galli - Grass weed - C4
- **c.** Amaranthus spinosus - Sedge - C4
- **d.** Portulaca oleracea - Grass weed - Crassulacean Acid Metabolism

8. What is the scientifically accepted binomial nomenclature for the weed commonly known as 'goosegrass' or 'wiregrass' in tropical agriculture?

- **a.** Eleusine indica
- **b.** Cynodon dactylon
- **c.** Imperata cylindrica
- **d.** Paspalum conjugatum

9. Which of the following pairs correctly identifies the scientific name and its corresponding common name of a highly competitive broadleaf vine weed?

- **a.** Commelina benghalensis - Spiny amaranth
- **b.** Ipomoea triloba - Three-lobe morning glory
- **c.** Rottboellia cochinchinensis - Purple nutsedge
- **d.** Mimosa pudica - Itchgrass

Practice Questions (10 - 18)

10. Weeds belonging to the family Asteraceae are generally classified morphologically as:

- **a.** Narrow-leaved grasses
- **b.** Sedges with modified rhizomes
- **c.** Broadleaf weeds
- **d.** Epiphytic parasitic weeds

11. If a weed exhibits net-like leaf venation, a prominent taproot system, and produces seeds with two cotyledons, it falls under which morphological and taxonomic category?

- **a.** Monocotyledonous grass
- **b.** Dicotyledonous broadleaf weed
- **c.** Monocotyledonous sedge
- **d.** Pteridophyte

12. 'Echinochloa colona' is a problematic weed primarily in which cropping system due to its morphological mimicry of the crop during early vegetative stages?

- **a.** Dryland maize
- **b.** Flooded lowland rice
- **c.** Plantation crops like rubber
- **d.** High-altitude temperate vegetables

13. How are parasitic weeds morphologically distinct from completely autotrophic weeds?

- **a.** They completely lack vascular tissues for water transport
- **b.** They possess specialized haustoria for nutrient extraction from host plants
- **c.** They have exclusively fibrous root systems spreading near the surface
- **d.** They exhibit exaggerated leaf surface areas to maximize independent photosynthesis

14. The invasive weed 'Chromolaena odorata' is notorious in pastures and plantation crops. What is its widely accepted common name?

- **a.** Siam weed
- **b.** Cogongrass
- **c.** Carabao grass
- **d.** Purple nutsedge

15. The presence of a ligule and an auricle at the junction of the leaf blade and sheath is a diagnostic feature used to identify weeds belonging to which botanical family?

- **a.** Cyperaceae
- **b.** Poaceae
- **c.** Convolvulaceae
- **d.** Amaranthaceae

16. How does the presence of dense weed populations directly impact the microclimate of a crop canopy, thereby severely affecting crop yield?

- **a.** It increases air circulation reducing the incidence of fungal diseases
- **b.** It elevates relative humidity and shades lower crop leaves leading to etiolation
- **c.** It significantly increases soil surface temperatures accelerating crop maturity
- **d.** It enhances the photosynthetically active radiation reaching the deeper crop roots

17. Allelopathy affects crop production primarily through which specific mechanism?

- **a.** Physical strangulation of crop stems by twining tendrils
- **b.** Release of biochemical phytotoxins into the rhizosphere that inhibit crop growth
- **c.** Depletion of available soil nitrogen by highly aggressive root systems
- **d.** Attraction of hyperparasites that directly feed on crop vascular tissues

18. When analyzing the reproductive capacity of 'Amaranthus spinosus', what characteristic makes its establishment particularly detrimental to subsequent cropping seasons?

- **a.** It produces vegetative runners that span several meters in a few weeks
- **b.** It relies solely on a single uniform flush of germination after rain
- **c.** It produces thousands of seeds that can remain viable in the soil seed bank for years
- **d.** It requires specific soil fungi to germinate which are easily managed

Practice Questions (19 - 27)

19. The establishment of perennial weeds like 'Imperata cylindrica' drastically reduces agricultural land value primarily because:

- **a.** They complete their life cycle in one month requiring constant shallow tillage
- **b.** Their extensive deep rhizome networks make mechanical eradication highly difficult and labor-intensive
- **c.** They exude volatile compounds that are lethal to grazing ruminants
- **d.** They attract beneficial pollinating insects away from the main crop

20. In a competitive environment, weed interference can lead to 'plastic responses' in crops. Which is a common morphological response of a crop heavily shaded by taller weeds?

- **a.** Increased lateral root biomass production
- **b.** Decreased overall plant height to conserve energy
- **c.** Increased internode elongation and significantly reduced tillering or branching
- **d.** Enhanced leaf thickness and increased chlorophyll concentration

21. Why is the timing of weed emergence relative to crop emergence a critical factor in determining total yield loss?

- **a.** Weeds that emerge later than the crop always produce higher quantities of seeds
- **b.** Early emerging weeds capture initial space and light leading to a disproportionate competitive advantage
- **c.** Crop roots secrete natural herbicides only during their earliest developmental stages
- **d.** Late emerging weeds do not consume any soil nutrients or water

22. Weeds that utilize vegetative propagules (such as tubers, rhizomes, or stolons) for reproduction present a unique challenge in agronomic management because:

- **a.** Standard cultivation or tillage can slice the propagules and inadvertently spread the infestation
- **b.** They have a very short lifespan in the soil compared to true seeds
- **c.** They are entirely immune to all known systemic herbicides
- **d.** They require cross-pollination by insects to remain viable in the soil profile

23. Weeds not only compete for resources but also serve as alternate hosts. 'Cyperus rotundus' is known to act as a significant alternate host for which type of agricultural pest?

- **a.** Nitrogen-fixing rhizobia bacteria
- **b.** Root-knot nematodes (Meloidogyne spp.)
- **c.** Beneficial predaceous ladybird beetles
- **d.** Symbiotic mycorrhizal fungi

24. Which agronomic practice is most likely to shift the weed population in a field from predominantly annual broadleaves to perennial grasses and sedges over time?

- **a.** Deep moldboard plowing executed every cropping season
- **b.** Implementation of a strict zero-tillage or conservation agriculture system
- **c.** Heavy and continuous reliance on pre-emergence dinitroaniline herbicides
- **d.** Frequent crop rotation with densely planted leguminous cover crops

25. What is the primary environmental factor that breaks seed dormancy and triggers synchronized weed seed germination following secondary soil tillage?

- **a.** A sudden decrease in soil aeration and porosity
- **b.** Exposure to a brief flash of light and altered oxygen-carbon dioxide ratios
- **c.** An immediate increase in soil compaction from tractor tires
- **d.** A drastic decrease in available soil moisture

26. The 'Critical Period of Weed Control' (CPWC) is an essential concept for evaluating crop-weed competition. It is precisely defined as:

- **a.** The developmental stage when herbicides are most easily absorbed by weed foliage
- **b.** The exact time interval when all weed seeds in the seed bank germinate
- **c.** The time interval during the crop life cycle when it must be kept weed-free to prevent unacceptable yield loss
- **d.** The period immediately before crop harvest when weeds cause the most severe threshing problems

27. Which morphological trait of a crop most significantly increases its competitive ability against weeds during early growth stages?

- **a.** Highly erect leaf orientation allowing maximum light penetration to the soil
- **b.** Rapid canopy closure and early vigorous ground cover
- **c.** Delayed germination to avoid early season pests
- **d.** A very shallow and limited root architecture

Practice Questions (28 - 36)

28. Anemochory is a dispersal mechanism that affects weed population dynamics over wide geographic areas. Which specialized weed structure facilitates this process?

a. Sharp hooks and barbs on the external seed coat
b. A heavy, fleshy, and brightly colored pericarp
c. A feathery pappus attached to the achene acting like a parachute
d. Thick, buoyant, corky seed coats filled with air pockets

29. How does the continuous and exclusive application of a single herbicide mode of action affect weed population dynamics over multiple consecutive seasons?

a. It permanently eradicates all weed species in the agricultural field
b. It increases the overall biodiversity and genetic richness of the weed flora
c. It exerts strong selection pressure that favors the survival and proliferation of resistant biotypes
d. It causes weeds to genetically transition from C4 to C3 photosynthetic pathways

30. In assessing crop-weed competition mathematically, the 'law of constant final yield' dictates that:

a. Total plant biomass per unit area remains constant regardless of plant density once the environmental carrying capacity is reached
b. Crops will always yield the same harvestable grain regardless of weed presence or density
c. Weed density has absolutely no mathematical relationship to total crop yield
d. High fertilizer application can completely negate the physiological effects of weed competition

31. Which agricultural factor would most likely rapidly decrease a weed seed bank's half-life in a tropical soil?

a. Burial of seeds deep into the anaerobic zone via aggressive moldboard plowing
b. Frequent soil disturbance that promotes suicidal germination followed by lethal control
c. Flooding the field continuously for an extended period of over ten years
d. Applying thick, heavy organic mulch to completely prevent light penetration

32. When adopting an Integrated Weed Management (IWM) strategy, which of the following practices represents a strictly 'cultural' method of weed control?

a. Applying glyphosate prior to planting the main crop
b. Releasing host-specific phytophagous insects into the field
c. Adjusting crop row spacing, seeding rate, and planting date to optimize crop competition
d. Manual hand weeding utilizing a hoe or machete

33. What is the primary biochemical mechanism of action for herbicides belonging to the sulfonylurea chemical family?

a. Direct inhibition of electron transport in Photosystem II
b. Inhibition of the enzyme acetolactate synthase (ALS), severely affecting branched-chain amino acid synthesis
c. Rapid disruption of cell membrane integrity via induced lipid peroxidation
d. Mimicking natural plant auxins causing unregulated, twisted epinastic growth

34. Biological weed control utilizing classical methods heavily involves which specific approach?

a. Synthesizing complex biochemicals from native plants to use as natural sprayable herbicides
b. Introducing an exotic, highly specific natural enemy from a weed's native range to control an introduced invasive weed
c. Grazing ruminant livestock in a field intensively prior to crop emergence
d. Applying formulated fungal spores via a mechanical boom sprayer in massive quantities

35. A pre-emergence herbicide is chemically designed to be applied at what specific stage in the crop production cycle?

- **a.** After the crop has fully emerged but before the weeds break the soil surface
- **b.** Before the crop is planted and prior to any weed emergence
- **c.** After the crop seed is planted but before both the crop and weeds emerge from the soil
- **d.** When weeds are actively growing at the 3- to 4-leaf stage

36. Which of the following environmental or operational conditions dramatically reduces the field efficacy of a foliar-applied systemic herbicide?

- **a.** Application during periods of high relative humidity without rain
- **b.** Application when target weeds are young and actively metabolizing
- **c.** Application immediately preceding a heavy rainfall event, washing off the active ingredient
- **d.** Application using purified, clean water as a carrier solution

Practice Questions (37 - 45)

37. The use of mycoherbicides represents an inundative biological control approach. What is a critical environmental limitation for their field success?

- **a.** They require highly specific insect vectors to spread effectively across a field
- **b.** They strictly demand high ambient moisture and specific temperature ranges for successful spore germination and infection
- **c.** They persist too long in the soil matrix, causing severe carryover damage to subsequent crops
- **d.** They only attack and colonize necrotic or dead plant tissue

38. The 'stale seedbed' technique is a weed mitigation strategy that actively involves:

- **a.** Planting crop seeds that are slightly past their expiration date to outcompete weeds early
- **b.** Inducing weed seed germination through irrigation or tillage, followed by lethal control prior to crop sowing
- **c.** Burying weed seeds deep in the soil profile where hypoxia prevents them from ever emerging
- **d.** Leaving the agricultural field entirely fallow for a minimum of five years

39. Paraquat is heavily regulated or banned in many jurisdictions. Based on its mode of action and soil behavior, what characterizes paraquat as a chemical tool?

- **a.** It is a highly selective systemic herbicide deemed completely safe for all broadleaf crops
- **b.** It is a non-selective contact herbicide that rapidly disrupts cell membranes and binds tightly to soil colloids upon contact
- **c.** It is a pre-emergence residual herbicide that actively prevents seed germination in the soil for several months
- **d.** It acts as a synthetic auxin, causing severe epinasty and slow vascular collapse

40. In lowland rice cultivation, manipulating field water depth is a highly effective weed management tool. Flooding primarily suppresses which type of weeds?

- **a.** Strictly aquatic weeds like Monochoria vaginalis and Sphenoclea zeylanica
- **b.** Most terrestrial grasses and sedges by severely restricting oxygen availability to germinating seeds
- **c.** Epiphytic weeds that grow on the stems of mature rice plants
- **d.** Free-floating aquatic weeds like Salvinia molesta or Eichhornia crassipes

41. Herbicide selectivity can sometimes be achieved through differential plant metabolism. In practical agronomy, this means that:

a. The crop plant rapidly detoxifies the active herbicide molecule into inert metabolites, while the target weed cannot

b. The spray nozzle is physically directed only at the weeds, avoiding crop foliage entirely

c. The herbicide is applied only during winter when the main crop is physiologically dormant

d. The weed absorbs the chemical exclusively through the roots while the crop absorbs it exclusively through the leaves

42. The Golden Apple Snail ('Pomacea canaliculata') is a devastating invasive mollusk in Asian rice production. What morphological feature allows it to survive extended periods of severe drought?

a. A highly vascularized mantle cavity acting as a lung and a tight operculum that seals the shell

b. The ability to completely shed its calcium shell and burrow deep into the water table

c. Excretion of a thick, hardened mucous layer that completely envelops the host rice plant

d. Specialized gills that filter residual water directly from the deep soil profile

43. What is the most vulnerable stage in the development of the Golden Apple Snail where mechanical control (like handpicking or crushing) is highly recommended and easiest to execute?

a. The adult snails buried deep in the mud during the dry fallow season

b. The newly hatched microscopic juveniles floating in the paddy water

c. The bright pink egg clusters deposited conspicuously on vegetation and structures above the water line

d. The mating phase, which occurs exclusively in deep water during the night

44. Scale insects (Coccoidea) are notorious invasive pests on fruit crops. What biological characteristic makes the adult females particularly difficult to control with standard contact insecticides?

a. They exhibit rapid, sustained flight enabling them to easily escape spray applications

b. They secrete a thick protective waxy covering or 'scale' under which they remain stationary and feed

c. They burrow deep into the woody cambium tissue of the host plant, avoiding surface exposure

d. They possess a highly thick, hardened chitinous exoskeleton identical to adult coleopterans

45. How do most armored scale insects disperse to new host plants, given that the adult females are completely sessile (immobile)?

a. Through the wind-borne or phoretic movement of their highly active first-instar nymphs known as 'crawlers'

b. By laying heavily armored eggs in the soil which hatch and directly burrow into new root systems

c. By permanently attaching themselves to migratory birds during an active pupal stage

d. Through the coordinated active flight of both the winged adult males and females during swarming

Practice Questions (46 - 50)

46. In establishing a control measure for invasive scale insects in a mango orchard, what is considered the most ecologically sound and sustainable long-term approach?

- **a.** Weekly prophylactic spraying of broad-spectrum synthetic pyrethroids
- **b.** Introduction and conservation of specific natural enemies such as coccinellid beetles and parasitoid wasps
- **c.** Complete mechanical defoliation of the entire orchard during the peak dry season
- **d.** Wrapping the main tree trunks in thick plastic sheeting to prevent crawler ascent from the soil

47. Which chemical control strategy is most appropriate to manage heavy infestations of scale insects while attempting to minimize broader environmental impact?

- **a.** Applying systemic insecticides like imidacloprid that are taken up by the plant sap, affecting only sap-feeding insects
- **b.** Broadcasting highly toxic granular organophosphates indiscriminately over the soil surface
- **c.** Fumigating the entire open orchard utilizing heavy gases like methyl bromide
- **d.** Utilizing non-selective contact herbicides to remove all alternate weed hosts in the vicinity

48. The invasive Giant African Snail ('Lissachatina fulica') poses a severe threat to agricultural crops. Beyond direct crop damage, what makes its presence a serious human health concern in rural communities?

- **a.** Its secreted slime is highly caustic and causes severe burns to human skin upon contact
- **b.** It serves as a primary intermediate host for the rat lungworm ('Angiostrongylus cantonensis'), which can cause eosinophilic meningitis in humans
- **c.** It emits volatile, noxious gases when threatened that cause severe respiratory distress in farmworkers
- **d.** Its defensive bite injects a mild but painful neurotoxin into the bloodstream

49. During the life cycle of a soft scale insect, what byproduct of their specialized feeding process significantly reduces the photosynthetic capacity of the host plant?

- **a.** Excretion of toxic digestive enzymes directly into the leaf stomata, causing localized necrosis
- **b.** Secretion of volatile allelopathic chemicals from their legs that stunt leaf expansion
- **c.** Excretion of copious amounts of honeydew, which strongly promotes the dense growth of black sooty mold on the leaf surface
- **d.** Shedding of highly reflective, shiny exuviae that repels necessary photosynthetically active radiation

50. When implementing an integrated management plan against the Golden Apple Snail in wetland rice, which cultural practice is most effective immediately after transplanting seedlings?

- **a.** Maintaining a deep, continuous flood of at least 10 centimeters to drown the snails
- **b.** Draining the field to maintain a saturated but strictly non-flooded condition for the first two weeks, restricting snail mobility
- **c.** Applying excessively high rates of urea fertilizer to speed up rice vegetative growth
- **d.** Broadcasting large amounts of raw rice bran over the water to attract the snails away from the young seedlings

Detailed Answer Key (All 50 Questions)

Q1: b	**Q2:** a	**Q3:** b	**Q4:** a
Q5: c	**Q6:** a	**Q7:** b	**Q8:** a
Q9: b	**Q10:** c	**Q11:** b	**Q12:** b
Q13: b	**Q14:** a	**Q15:** b	**Q16:** b
Q17: b	**Q18:** c	**Q19:** b	**Q20:** c
Q21: b	**Q22:** a	**Q23:** b	**Q24:** b
Q25: b	**Q26:** c	**Q27:** b	**Q28:** c

Q29: c	**Q30:** a	**Q31:** b	**Q32:** c
Q33: b	**Q34:** b	**Q35:** c	**Q36:** c
Q37: b	**Q38:** b	**Q39:** b	**Q40:** b
Q41: a	**Q42:** a	**Q43:** c	**Q44:** b
Q45: a	**Q46:** b	**Q47:** a	**Q48:** b
Q49: c		**Q50:** b	