

Crop Science Reviewer Based On TOS

Factors Affecting Crop Production | Published by Agriculture Review

1. Which of the following is an example of an edaphic factor affecting crop production?

- a) Soil pH
- b) Rainfall
- c) Relative humidity
- d) Photoperiod

2. The process by which plants exhibit elongated, pale, and weak stems due to insufficient light is known as what?

- a) Chlorosis
- b) Etiolation
- c) Phototropism
- d) Vernalization

3. Which climatic factor primarily dictates the geographic distribution of crop species worldwide?

- a) Wind velocity
- b) Atmospheric pressure
- c) Temperature
- d) Soil texture

4. What is the cardinal minimum temperature for the germination of most tropical crops like rice?

- a) 0 to 5 C
- b) 10 to 15 C
- c) 20 to 25 C
- d) 30 to 35 C

5. The ratio of crop yield to the amount of water depleted by the crop in the process of evapotranspiration is called:

- a) Water Use Efficiency
- b) Harvest Index
- c) Crop Growth Rate
- d) Transpiration Ratio

6. High relative humidity during the reproductive stage of rice can lead to which physiological issue?

- a) Enhanced pollen shedding
- b) Poor anther dehiscence and spikelet sterility
- c) Increased transpiration rate
- d) Stomatal opening at night

7. Which of the following describes the photoperiodic response of soybeans?

- a) Short-day plant
- b) Long-day plant
- c) Day-neutral plant
- d) Intermediate-day plant

8. Vernalization is a requirement for certain crops to induce flowering. Which factor triggers this process?

- a) High temperature
- b) Low temperature
- c) Short days
- d) Long days

9. Heavy rainfall leading to waterlogging causes oxygen depletion in the root zone. Which metabolic pathway takes over in roots under these anaerobic conditions?

- a) Oxidative phosphorylation
- b) Photorespiration
- c) Fermentation
- d) Krebs cycle

10. Strong winds can cause mechanical damage to crops, such as lodging. Which architectural trait helps mitigate lodging in cereal crops?

- a) Tall stature with thin stems
- b) Shallow root system
- c) Short stature and thick internodes
- d) Broad leaves with high SLA

11. What is the most critical stage for water stress in corn (*Zea mays*) where yield reduction is most severe?

- a) Vegetative stage
- b) Silking and tasseling stage
- c) Dough stage
- d) Physiological maturity

12. In lowland rice, which growth stage is highly sensitive to high temperatures, potentially causing spikelet sterility?

- a) Tillering
- b) Panicle initiation
- c) Anthesis
- d) Dough stage

13. The critical period for weed control (CPWC) in most field crops generally coincides with which phase?

- a) Early vegetative growth
- b) Flowering stage
- c) Grain filling
- d) Maturation

14. What is the critical growth stage for moisture stress in mungbean that drastically affects pod formation?

- a) Emergence
- b) First trifoliate leaf
- c) Flowering and early pod development
- d) Pod maturity

15. During the booting stage in cereal crops, what developmental process is occurring?

- a) Seed germination
- b) Tiller formation
- c) Panicle enclosed by the flag leaf sheath
- d) Grain hardening

16. Moisture stress during the grain filling stage of wheat primarily results in which yield component reduction?

- a) Number of tillers per plant
- b) Number of spikelets per spike
- c) Seed weight or shriveled grains
- d) Number of plants per square meter

17. In sugarcane, the stage of maximum water requirement occurs during:

- a) Germination phase
- b) Formative and grand growth phase
- c) Maturity phase
- d) Ripening phase

18. Which phenological stage of peanut is most vulnerable to calcium deficiency, leading to pops or unfilled pods?

- a) Seedling stage
- b) Pegging and pod development
- c) Flowering
- d) Maturation

19. For most fruit trees, water stress during which stage leads to severe fruit drop?

- a) Dormancy
- b) Bud break
- c) Post-harvest
- d) Flowering and early fruit set

20. Identifying critical growth stages is essential for:

- a) Increasing seeding rate
- b) Determining the timing of maximum weed tolerance
- c) Scheduling precision irrigation and fertilizer application
- d) Delaying harvest operations

21. Which of the following is considered a beneficial biotic factor in legume crop production?

- a) *Striga hermonthica*
- b) *Rhizobium* bacteria
- c) *Meloidogyne incognita*
- d) *Spodoptera frugiperda*

22. Weeds compete with crops for light, water, and nutrients. Which ecological principle explains this interaction?

- a) Mutualism
- b) Commensalism
- c) Amensalism
- d) Competitive exclusion

23. Allelopathy is a biotic interaction where one plant inhibits the growth of another. This is mediated by the release of:

- a) Volatile organic compounds and root exudates
- b) Nitrogen gas
- c) Oxygen bubbles
- d) Mycorrhizal spores

24. Which of the following is a parasitic weed that poses a major biotic constraint to cereal crop production in many tropical regions?

- a) Echinochloa crus-galli
- b) Striga species
- c) Cyperus rotundus
- d) Amaranthus spinosus

25. The release of Trichogramma wasps to control stem borers in corn is an application of which biotic interaction?

- a) Antibiosis
- b) Parasitism
- c) Symbiosis
- d) Commensalism

26. Mycorrhizal fungi form mutualistic associations with crop roots primarily to enhance the uptake of which nutrient?

- a) Nitrogen
- b) Phosphorus
- c) Calcium
- d) Sulfur

27. Soil nematodes can be a severe biotic constraint. How do root-knot nematodes primarily affect crop yield?

- a) By feeding on leaves and reducing photosynthesis
- b) By transmitting viral diseases to the shoot
- c) By forming galls on roots that disrupt water and nutrient uptake
- d) By fixing nitrogen inefficiently

28. Which type of biotic stress involves the secretion of phytotoxins by pathogens to induce cell death in the host plant?

- a) Biotrophic infection
- b) Necrotrophic infection
- c) Mutualistic symbiosis
- d) Commensalism

29. What is the primary role of insect pollinators as a biotic factor in crop production?

- a) Increasing vegetative biomass
- b) Enhancing fruit set and seed yield in cross-pollinated crops
- c) Reducing the incidence of fungal diseases
- d) Suppressing weed germination

30. The condition where a plant disease becomes severe due to the widespread planting of a single genetically uniform crop variety is known as:

- a) Genetic erosion
- b) Genetic vulnerability
- c) Hybrid vigor
- d) Polyculture resilience

31. In crop production, yield (Y) is commonly expressed as a function of which fundamental equation?

- a) $Y = \text{Genotype} + \text{Environment}$
- b) $Y = \text{Genotype} \times \text{Environment}$
- c) $Y = \text{Genotype} + \text{Environment} + (\text{Genotype} \times \text{Environment})$
- d) $Y = \text{Environment} - \text{Genotype}$

32. Which genetic concept refers to the superiority of an F1 hybrid over its parents in terms of yield or vigor?

- a) Inbreeding depression
- b) Heterosis
- c) Epistasis
- d) Pleiotropy

33. Why is varietal selection considered the most critical initial step in crop production?

- a) It eliminates the need for fertilizers
- b) It dictates the crop's genetic potential for yield and resistance
- c) It prevents all abiotic stresses
- d) It ensures immediate financial subsidies

34. A crop variety bred to perform well across diverse environments exhibits high:

- a) Phenotypic plasticity
- b) Genetic drift
- c) Specific adaptation
- d) Yield stability

35. Which of the following is a trait targeted for genetic improvement to tolerate abiotic stress (drought)?

- a) Shallow root systems
- b) High stomatal conductance during midday
- c) Osmotic adjustment
- d) Large leaf area index

36. The integration of the Sub1 gene into rice varieties provides tolerance to which abiotic stress?

- a) Salinity
- b) Drought
- c) Submergence or flooding
- d) Cold temperature

37. In terms of genetic factors, what does lodging resistance usually entail?

- a) Taller plants with heavy panicles
- b) Dwarf or semi-dwarf genes conferring shorter and stiffer stems
- c) Susceptibility to stem borers
- d) Late maturity

38. Why do agriculturists advocate for the use of certified seeds during varietal selection?

- a) They are the cheapest option available
- b) They guarantee genetic purity and high germination rate
- c) They require zero chemical inputs
- d) They can be saved indefinitely without loss of vigor

39. Which term describes a genotype's ability to alter its morphology or physiology in response to environmental changes?

- a) Heritability
- b) Phenotypic plasticity
- c) Genetic erosion
- d) Mutagenesis

40. A farmer in a typhoon-prone area should prioritize which genetic trait during varietal selection of rice?

- a) Aromatic grain quality
- b) Early maturity and strong culm
- c) Late maturity
- d) Susceptibility to shattering

41. How does an abiotic factor like high soil moisture (waterlogging) interact with biotic factors to affect crop health?

- a) It decreases weed competition entirely
- b) It promotes the proliferation of soil-borne fungal pathogens like Pythium
- c) It increases the population of beneficial earthworms
- d) It prevents all nematode infestations

42. The disease triangle concept in plant pathology illustrates the interaction between which three factors?

- a) Host plant, Pathogen, and Environment
- b) Soil, Water, and Air
- c) Pathogen, Vector, and Weeds
- d) Genotype, Phenotype, and Yield

43. How does elevated atmospheric CO₂ generally affect C3 crops under adequate water and nutrient supply?

- a) It decreases photosynthetic rate
- b) It increases photosynthetic rate and vegetative biomass
- c) It completely inhibits flowering
- d) It reduces the crop's carbon-to-nitrogen ratio

44. Which scenario describes a Genotype x Environment (GxE) interaction?

- a) Variety A outyields Variety B in both wet and dry seasons
- b) Variety A outyields Variety B in the wet season, but Variety B outyields Variety A in the dry season
- c) Both varieties fail to germinate
- d) Both varieties have the same exact yield everywhere

45. Nitrogen application can sometimes increase the severity of rice blast disease. This is an example of:

- a) Negative allelopathy
- b) Crop-weed competition
- c) Nutrition-disease interaction
- d) Genetic modification

46. Climate change is expected to influence pest populations primarily by:

- a) Decreasing pest metabolic rates
- b) Altering pest geographic distribution and accelerating life cycles
- c) Making crops immune to all pests
- d) Eliminating polyphagous insects

47. Which abiotic factor is closely linked to sunscald on fruits, often exacerbated by defoliating biotic pests?

- a) High soil moisture
- b) Low temperatures
- c) High solar radiation and temperature
- d) Strong winds

48. A farmer uses a drought-tolerant variety but still experiences yield loss due to a heavy locust outbreak during a dry spell. This illustrates that:

- a) Genetic factors are useless
- b) Biotic and abiotic factors can have compounding negative effects on yield
- c) Drought-tolerant varieties attract locusts
- d) Only biotic factors determine yield

49. High temperature stress often compromises a crop's resistance to pathogens by suppressing defense-related hormones like:

- a) Gibberellins
- b) Salicylic acid
- c) Cytokinins
- d) Auxin

50. To optimize overall crop performance, an agriculturist must adopt an integrated approach that:

- a) Focuses solely on applying chemical fertilizers
- b) Ignores genetic factors in favor of environmental control
- c) Harmonizes varietal selection with precise management of both biotic and abiotic constraints
- d) Eliminates all biotic organisms from the field

Detailed Answer Key (Questions 1 - 50)

Q1: a	Q2: b	Q3: c	Q4: b	Q5: a
Q6: b	Q7: a	Q8: b	Q9: c	Q10: c
Q11: b	Q12: c	Q13: a	Q14: c	Q15: c
Q16: c	Q17: b	Q18: b	Q19: d	Q20: c
Q21: b	Q22: d	Q23: a	Q24: b	Q25: b
Q26: b	Q27: c	Q28: b	Q29: b	Q30: b
Q31: c	Q32: b	Q33: b	Q34: d	Q35: c
Q36: c	Q37: b	Q38: b	Q39: b	Q40: b
Q41: b	Q42: a	Q43: b	Q44: b	Q45: c
Q46: b	Q47: c	Q48: b	Q49: b	Q50: c