Answer Key

Unit 1: Irrigation Management in Vegetable Crops

Session 1: Irrigation and Water Quality

A. Fill in the blanks

1. element
2. frequent, more water
3. poor
4. 6.5-8.5

B. Multiple choice questions

1. (a) 2. (a) 3. (c) 4. (d) 5. (a)

D. Match the columns

1. (d) 2. (c) 3. (e) 4. (a) 5. (b)

Session 2: Water Requirement and Irrigation Methods

A. Fill in the blanks

1. irrigation scheduling
2. critical stage
3. border irrigation
4. overhead irrigation
5. bulb formation stage
6. emitters or drippers
7. drip irrigation

B. Multiple choice questions

1. (a) 2. (c) 3. (a) 4. (c) 5. (d)

D. Match the columns

1. (c) 2. (d) 3. (a) 4. (e) 5. (b)

Unit 2: Weed Management in Vegetable Crops

Session 1: Weeds in Vegetable Crops

A. Fill in the blanks

1. weeds
2. two seed leaves
3. annual
4. Perennial
5. grassy

B. Multiple choice questions

1. (b) 2. (d) 3. (a) 4. (a) 5. (b)

D. Match the columns

1. (c) 2. (e) 3. (a) 4. (b) 5. (d)

Session 2: Weed Management

A. Fill in the blanks

1. intercropping
2. 44–50
3. crop rotation
4. hand weeding
5. post-emergence

B. Multiple choice questions

1. (b) 2. (b) 3. (d) 4. (c) 5. (a)

D. Match the column

1. (e) 2. (d) 3. (a) 4. (b) 5. (c)

Unit 3: Integrated Pest and Disease Management in Vegetable Crops

Session 1: Major Insect-pests of Solanaceous Crops

A. Fill in the blanks

1. African marigold
2. tomato aphids
3. leaf miner
4. curl upwards
5. mites
6. shoot and fruit borer

B. Multiple choice questions

1. (b) 2. (a) 3. (c) 4. (b) 5. (d)

D. Match the columns

1. (e) 2. (a) 3. (b) 4. (c) 5. (d)

Session 2: Major Diseases of Solanaceous Crops

A. Fill in the blanks

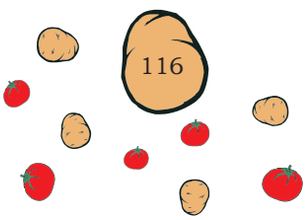
1. Damping off
2. Little leaf of brinjal
3. die-back
4. nematodes
5. virus

B. Multiple choice questions

1. (a) 2. (d) 3. (c) 4. (b)

D. Match the columns

1. (c) 2. (d) 3. (e) 4. (a) 5. (b)



Session 3: Integrated Pest and Disease Management of Solanaceous Crops

A. Fill in the blanks

1. diamond black moth
2. brinjal
3. trap crop
4. nitrogen
5. male
6. fruit flies
7. predator

B. Multiple choice questions

1. (b) 2. (c) 3. (a) 4. (a) 5. (a)

D. Match the columns

1. (c) 2. (d) 3. (e) 4. (b) 5. (a)

Unit 4: Harvest and Post-harvest Management

Session 1: Maturity Standards and Harvest of Solanaceous Crops

A. Fill in the blanks

1. physiological maturity
2. tomato and muskmelon
3. non-climacteric
4. morning, evening

B. Multiple choice questions

1. (b) 2. (a) 3. (a) 4. (b) 5. (a)

D. Match the columns

1. (b) 2. (c) 3. (d) 4. (e) 5. (a)

Session 2: Post-harvest Handling of Solanaceous Vegetable Crops

A. Fill in the blanks

1. pre-cooling
2. 100–150
3. cold chain
4. packaging

B. Multiple choice questions

1. (c) 2. (b) 3. (c) 4. (c) 5. (d)

D. Match the columns

1. (e) 2. (d) 3. (c) 4. (b) 5. (a)

NOTES

Unit 5: Basic Farm Management

Session 1: Farm Management and Selection Criteria of Vegetable Crops

A. Fill in the blanks

1. fixed costs and variable costs
2. single entry system
3. double entry system
4. processing unit
5. storage

B. Multiple choice questions

1. (b)
2. (a)
3. (b)
4. (a)
5. (b)

D. Match the columns

1. (c) 2. (d) 3. (e) 4. (b) 5. (a)

Session 2: Basic Market Information

A. Fill in the blanks

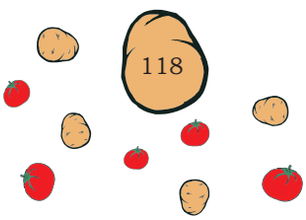
1. 1, 2
2. demand and supply
3. Agricultural and Processed Food Products Export Development Authority
4. market intelligence system
5. October 2, 1958

B. Multiple choice questions

1. (d) 2. (a) 3. (d) 4. (b)

D. Match the columns

1. (d) 2. (c) 3. (b) 4. (e) 5. (a)



GLOSSARY

Admixture: *mixing an ingredient with something else.*

Adulteration: *addition of a substance, which may result in the loss of actual quality.*

Alternate host: *an organism that serves as a temporary host in the absence of host.*

Barrier crop: *a tall growing crop that inhibits insects from flying over.*

Biochemical: *a chemical process, that occurs in living organisms.*

Bioherbicide: *an organism that is toxic to unwanted vegetation and is used to destroy weeds.*

Bulbs: *a round underground storage organ. It is present in some plants. It consists of a short stem surrounded by fleshy scale leaves or leaf bases.*

Buldgy: *a protruding part with an outward curve or swelling.*

Cochineal insects: *a scarlet dye used for colouring food, made from the crushed dried bodies of a female scale insect.*

Coir: *fibre from the outer husk of a coconut.*

Concentric rings: *rings with a common centre.*

Conservation: *preservation, prevention.*

Corms: *it is the same thing as a bulb.*

Cost of cultivation (Rs/ha): *the expenditure incurred from field preparation to harvest is calculated at rupees per hectare.*

Depletion: *exhaustion*

Determinate type: *plants, such as tomato, that terminate in flower buds, self topping type.*

Diffusion: *the movement of molecules from high to low concentration.*

Disperse: *spreading something over a large area.*

Disseminate: *spread, circulate, distribute.*

Dormant: *resting period. Not active.*

Dumping: *deposit or dispose of waste carelessly.*

Entomopathogenic: *pathogenic to insects.*

Eradicate: *destroy completely, put an end to, eliminate.*

Evapo-transpiration: *the process by which water is transferred to the atmosphere. It could be by evaporation from the soil and other surfaces and by transpiration from plants.*

Fertigation: *it is the process of direct application of water soluble solid fertilisers or liquid fertilisers with irrigation water.*

Fungicides: *it is a substance or chemical used to kill or control fungi.*

Gross returns (Rs/ha): *the yield is computed per hectare and the total income worked out at rupees per tonne according to the prevailing market price.*

Notes

Heavy metal: *a metal of relatively high density or high relative atomic weight.*

Herbaceous: *tender, grassy.*

Homogenous: *denoting a process involving substances in the same phase.*

Indeterminate type: *tall (vine like) growing varieties.*

Infestation: *an unusually large number of insects present in a particular place or host.*

Insect: *a small animal of the insect class with three pairs of legs, two pair of wings, and body divided into three segments head, thorax and abdomen.*

Insecticides: *a substance or chemical used to kill or control insects.*

Insulate: *protect from heat, cold or noise.*

Irrigation interval: *a break in the number of days between two consecutive irrigations during the critical period of consumptive use of the crop. The interval depends on the crop, soil and climate.*

Irrigation scheduling: *is the frequency of water application in which water is to be applied based on the needs of the crop and nature of the soil.*

Maturity indices: *measurement that can be used to determine whether a particular commodity is mature.*

Mulching: *applying coarse plant residue or chips, or other suitable material, to cover the soil surface. It reduces evaporation from soil surface and weed growth.*

Myco-herbicide: *fungus or fungi used to destroy weeds.*

Nematicides: *chemicals that control nematodes.*

Net returns (Rs/ha): *obtained by subtracting the cost of cultivation from gross returns for each treatment and expressed as rupees per hectare.*

Osmosis: *a fluid, usually water, passing through a semi-permeable membrane into a solution where the solvent concentration is higher.*

Parasite: *an organism which lives in or on another living organism (its host) and benefits by drawing nutrients at the other's expense.*

Parasitoid: *an insect whose larva lives as a parasite and eventually kills the host.*

Pathogens: *any organism that causes disease in another organism.*

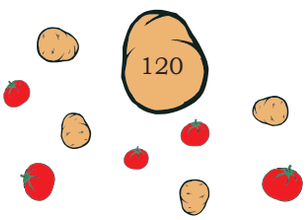
Permeable: *a material or membrane that allow liquid or gas to pass through it.*

Pest: *a destructive being that attacks crop, livestock, food, etc.*

Pesticide: *a substance used to control pests.*

Pheromone trap: *a trap that uses pheromones to lure insects.*

Pheromone: *a chemical that is secreted or excreted to trigger a social response in members of the same species.*



Photosynthesis: *a process in which green plants convert solar energy into chemical energy and later release it as fuel.*

Physiology: *a branch of biology that deals with the functions and activities of living organisms and their parts, including all physical and chemical processes.*

Phytotoxic: *lethal to plants*

Porous: *material having minute interstices (spaces) through which liquid or air can pass.*

Predator: *an organism that preys on other organisms.*

Residue: *something that remains after use; remainder.*

Respiration: *inhalation and exhalation of air by a living organism.*

Rhizomes: *a continuously growing horizontal underground stem, which puts out lateral shoots and adventitious roots at intervals.*

Scars: *marks of injuries.*

Shelf life: *the length of time for which an item remains usable or fit for consumption.*

Sodium Absorbance Ratio (SAR): *it is an irrigation water quality parameter to determine the concentration of ions of sodium and calcium plus magnesium content in the water.*

Soil borne: *inhabitant of soil; lives and grows in soil.*

Solarisation: *using solar power for controlling pests.*

Succulent: *a plant having thick fleshy leaves or stems adapted to storing water; juicy.*

Sunken spot: *a spot that is deeper in the centre and shallow on the outer sides.*

Systemic insecticides: *insecticides translocated to various parts of the plant irrespective of the part applied to.*

Thuricide (*Bacillus thuringiensis*): *a liquid formulation of bacteria that controls caterpillars, loopers, etc.*

Trap crop: *a crop that you add to your garden to attract pests away from the main crop.*

Trimming: *to put into a neat or orderly condition by clipping.*

Tubers: *a much thickened underground part of a stem.*

Vacuum: *a region with gaseous pressure much less than the atmospheric pressure.*

Vectors: *carrier of pathogens.*

Viable: *able to germinate or grow.*

NOTES

List of Credits

Unit1: Irrigation Management in Vegetable Crops

Fig. 1.1 : Sources of irrigation water
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.1.2 : pH colour strip scale
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.1.3 : Digital pH meter
Courtesy: Prof. R K Pathak, DAAH, PSSCIVE, Bhopal

Fig.1.4 : Digital Electrical Conductivity (EC) meter
Courtesy : https://bit.ly/2WLpwdG

Fig.1.5 : Irrigation systems and methods
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.1.6 : Flood irrigation method
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.1.7: Border irrigation method
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.1.8 : Line diagram of check basin irrigation method
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 1.9 : Line diagram of ring and basin irrigation methods
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 1.10 : Furrow irrigation method
Courtesy : https://bit.ly/2E9okKV

Fig.1.11a: View of sprinkler or overhead irrigation system
Courtesy : https://bit.ly/2pcDdEj

Fig.1.11b: View of sprinkler or overhead irrigation system
Courtesy : https://bit.ly/2D3GqQi

Fig.1.11c: View of sprinkler or overhead irrigation system
Courtesy : https://bit.ly/2NibMHn

Fig.1.11d: View of sprinkler or overhead irrigation system
Courtesy : https://pxhere.com/en/photo/765816

Fig.1.12 : Components of drip irrigation system
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 1.13 : Component and layout of drip irrigation system
Courtesy : https://bit.ly/2MPyenZ

Unit 2: Weed Management in Vegetable Crops

Fig. 2.1 : Broadleaf weeds, Camphor grass (*Chromolaena odorata*)
Courtesy : https://bit.ly/2NioiH2

Fig. 2.2 : Grassy weeds Johnsongrass (*Sorghum halepense*)
Courtesy: https://bit.ly/2Nlj0dO

Fig.2.3 : Amaranth (*Amaranthus viridus*)
Courtesy : https://bit.ly/2pfFG0G

Fig. 2.4 : *Common Crabgrass (Digitaria sanguinalis)*
Courtesy : https://bit.ly/2xqfJPI

Fig.2.5 : Bathua or Pigweed (*Chenopodium album*)
Courtesy : https://bit.ly/2NkcGmI

Fig.2.6 : Field bindweed or Hirankhuri (Convolvulus arvensis)
Courtesy : https://bit.ly/2pcW55Z

Fig.2.7 : Amaranth (Amaranthus viridus)
Courtesy : https://bit.ly/2D5Pkwz

Fig.2.8 : Satyanashi or Mexican poppy (Argemone mexicana)
Asthma Plant (Euphorbia hirta)
Courtesy : https://bit.ly/2xjavG7

Fig.2.9 : Bathua or Pigweed (Chenopodium album)
Courtesy : https://bit.ly/2QCnURS

Fig.2.10 : Creeping thistle (Cirsium arvense)
Courtesy : https://bit.ly/2Nk4hA2

Fig.2.11 : Doob grass or Bermuda (Cynodon dactylon)
Courtesy : https://bit.ly/2QzAPnn

Fig.2.12 : Purple nut sedge or Motha (Cyperus rotundus)
Courtesy : https://bit.ly/2MEg9aQ

Fig. 2.13 : Bishkhapra (Boerhavia difusa)
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 2.14 : Methods of weed control
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 2.15 : Types of Herbicides
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 2.16 : Knapsack sprayer
Courtesy : https://bit.ly/2E9p2YB

Unit 3: Integrated Pest and Disease Management in Vegetable Crops

Fig 3.1 : Whiteflies in tomato
Courtesy : https://bit.ly/2W0MYap

Fig 3.2 : Aphids in tomato
Courtesy : https://bit.ly/2ZmHC7v

Fig 3.3 : Leaf hopper in brinjal
Courtesy : https://bit.ly/2MKKWIc

Fig 3.4 : Aphids in brinjal
Courtesy : https://bit.ly/2Q1rIfq

Fig.3.5 : Early blight of tomato
Courtesy : https://bit.ly/2MFLXfk

Fig.3.6 : Late blight of tomato
Courtesy : https://bit.ly/2PZVkKf

Fig.3.7 : Leaf curl in tomato
Courtesy : https://bit.ly/2Nm7i2R

Fig.3.8 : Root knot in tomato
Courtesy : https://bit.ly/2MHFUqR

Fig.3.9 : Phomopsis blight in brinjal

List of Credits

Notes

Courtesy : https://bit.ly/2NgLbul

Fig.3.10 : Little leaf in brinjal
Courtesy : https://bit.ly/2NjbxvR

Fig.3.11 : Cercospora leaf spot in Brinjal
Courtesy : https://bit.ly/2NRKkzK

Fig.3.12 : Fusarium wilt in tomato
Courtesy : https://bit.ly/2OuSqvv

Fig.3.13 : Integrated pest management (IPM)
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.3.14 : Biological pest control

Two spotted lady beetle (*Adalia bipunctata*) feeding amongst aphid colony

Courtesy : https://bit.ly/2VlHZg9

Fig.3.15 : Biological pest control (The parasitoid wasp *Adalia bipunctata* laying eggs on a caterpillar)
Courtesy : https://bit.ly/2xkikLG

Unit 4: Harvest and Post-harvest Management

Fig. 4.1 : Maturity indices of solanaceous vegetable crops
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 4.2 : A view of maturity stages in tomato
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 4.3 : Maturity stages of tomato
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.4.4 : Harvesting container (Plastic crates)
Courtesy : DAAH, PSSCIVE, Bhopal

Fig. 4.5 : Methods of pre-cooling
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.4.6 : Packing in the field and transport to packing house
Courtesy : DAAH, PSSCIVE, Bhopal

Fig.4.7 : Corrugated cardboard boxes
Courtesy : https://bit.ly/2XH5Yvs

Further Reading

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