

Sher-e-Bangla Agricultural University
Department of Agronomy (M.S.)
Course Title: Crop Physiology Stress Agronomy
Course code: AGRO- 506 **Credit hours: 3**

Course Content

Crop physiology:

Crop growth and development: Growth curve, growth limiting factors, growth stages of some major crops, relations of dry matter accumulation with interception and conversion of solar radiation, photosynthesis in C₃ and C₄ plants, soil-water-plant relationships, thermal time in relation to crop, growth. Agronomic management of optimum growth. Growth analysis: plant height, leaf area, leaf area index, leaf net assimilation rate, crop growth rate, relative growth rate, specific leaf weight, light transmission ratio. Leaf, stem and root growth.

Rate of development, relationships of development of temperature, photo period, photothermal time, solar radiation, assimilate supply, stress, determinacy and growth.

Reproductive development: Flowering initiation, switching mechanism.

Inflorescence formation: Histogenesis, grain formation

Yield components, factors influencing grain formation and grain filling, relations of yield with climatic parameters, determinacy, harvest index, source-sink relations, partitioning of dry matter, plasticity of vegetative growth, growth and development, green area duration, senescence, duration of reproductive period, crop nutrition and water management, population density, cropping systems and agronomic management.

Stress Agronomy:

Deep water stress: Concept, crop response to deep water stress, characteristics of flood water, factors affecting survival and morphological change of submerged plants, management of deep water stress in crops.

Drought stress: Concept, nature, causes and kinds of drought, effect of drought on crops, basis of drought tolerance, available technologies to reduce crop losses from drought.

Light stress: Nature and causes of light stress, crop growth, development and yield mechanisms due to light intensity and photoperiod.

High temperature stress: Concept, high temperature injuries in plants, adaptation features in plants due to high temperature, agronomic manipulations to mitigate crop losses due to high temperature.

Cold stress: Concept, types of cold shocks, symptoms of cold temperature injuries in plants, management of cold stress in crops.

Salinity stress: Concept, kinds of salinity, occurrence, nature and extent of crop damage, salinity management.

Heavy metal stress: Concept, plant responses to heavy metals, plants tolerance to heavy metals

REFERENCE:

Crop Physiology:

1. Evans, I.T. 1975. The physiological basis of crop yield. In: Crop Physiology Evans. I.T. (Eds) Camb. Univ. Press.
2. Gardner, F.P.; Pearce, R.B. and Michell, R.I. 1988. Physiology of Crop Plants, Scientific Publishing. Jodhpur, India.
3. Goldsworthy, P.R. and Fisher, N.M. (Eds.) 1974. The Physiology of Tropical Field Crops. John Willey and Sons. New York.
4. Gupta, U.S. 1975. Physiological Aspects of Dry Land Farming. Oxford and IBH Publishing Pvt. Ltd. New Delhi.
5. Harper, J.L. 1977. Population Biology of Plants, Academic Press. New York.
6. Malik, C.P. and Srivastava, A.K. 1982. Textbook of Plant Physiology. Kalyani Publishers. New Delhi, India.
7. Marachan, Y.B. 1986. Crop Production Management Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
8. Pandey, S.N. and Sinha, B.K. 1990. Plant Physiology. Vikas Publishing House Pvt. Ltd. New Delhi.
9. Swire, G.R. 1990. The Physiology of Tropical Crop Production. CAB International. Wallingford, Oxon, U.K.
10. Ullah, M.J.; Karim, M.F.; Bhuiyan, S.U. and Ali, M.H. 2000. Fasal Utpadon Poribesh O Babosthapon. Haji Mohammad Shahidullah, 281/10, Pirerbag, Dhaka.
11. Wild, A. (Ed.) 1988. Russell's Soil Conditions and Plant Growth. Longman Essex CM 202 JE. U.K.

Stress Agronomy:

1. Acharya, M.S. and Gupta, A.P. 1990. Hydrological aspects of drought for stabilizing agricultural production in Rajasthan State. International Symposium on Natural Resources management for Sustainable Agriculture. 6-10 February, New Delhi.
2. Alim, M.S. 1991. Technological aspects of pre-monsoon climatic effects on agricultural production. Paper presented in the National Workshop on Risk Management in Bangladesh Agriculture BARC, Dhaka. 24-27 August.
3. De Datta, S.K. and Banerji, B. 1972. Performance of flood resistant and deep water rice in relation to growth and yield under different cultural practices. Indian Journal of Agricultural Science. 12: 664-670.
4. Dhaliwal, G.S. and Arora, R. 1999. Environmental stress in crop plants. Commonwealth.
5. Enus, M., Vergara, B.S. Peralta, J.A. and Ikehashi, H 1980. Methods of screening rice seedling for drought tolerance during rapid generation advance. IRRN 5(4): 10-12.
6. Gupta, U.S. 1975. Physiological aspects of dry land farming. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
7. IRRI. 1976. Climate and rice. Los Banos, Laguna, Philippines.

8. IRRI. 1989. Climate and flood security. P.O. Box. 933, 1099, Manila, Philippines.
9. Levitt, J. 1972. Response of plants to environmental stresses. Academic Press, N.Y.
10. Rahman, M.S. 1991. Weather related conditions to crop production and technological support to avoid risk in agriculture. Paper presented at the National Workshop on Risk Management in Bangladesh Agriculture, BARC, Dhaka. 24-27 August.
11. Zaman, S.M. H. 1986. Current status and prospects for rainfed flood grain production in Bangladesh. BRRI, Bangladesh.