

Advanced Crop Science
Outline: Crop Growth and Development (Section 2)

1. Essentials for plant growth
Requirements for growth
2. Crop establishment
Seeds and germination
Seedling establishment and seedling vigor
Plant populations and spacing
3. Leaf area, light interception, and crop spacing
Leaf area and canopy development
Light interception and plant spacing
Plant architecture and productivity
4. Photosynthesis, respiration and dry matter production.
Photosynthesis and respiration
Carbohydrate production, dry matter partitioning and yield
5. Water use, transpiration and water use efficiency
Plant and crop water requirements
Methods of application
Transpiration and evapotranspiration
Water use efficiency
6. Thermal requirements and photoperiod
Temperature requirements for growth
Temperature tolerance and genotype selection
Heat units and crop development
7. Plant nutrition and fertilizer use
Essential elements and plant requirements
Nutrient availability and nutrient uptake
Deficiency symptoms and remediation
Fertilizer application, soil and foliar
8. Reproduction.
Reproductive growth and development
Environmental effects on seed and fruit development
9. Root growth
Below ground development and requirements
Root effects on shoot growth and yield development

10. Yield development
Seasonal patterns, partitioning
Effects of stress
11. Crop Management
Interaction of growth requirements
Production problems and scientific management
12. Crop ecological principals
Crop growth and the environment
Environmental protection