Plant Pigments and Photosynthesis

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Abstract: Plant pigments play important roles in harnessing energy from sunlight. This lesson examines the two major classes of photosynthetic pigments, chlorophylls and carotenoids, their biochemical structures, and their biosynthesis. The organization of these pigments into photosynthetic pigments, which are protein complexes that harvest light and convert its energy into biochemical energy, is explained. This is a lesson in the Library of Crop Technology (http://croptechnology.unl.edu) designed to teach the basics for weed science education. The objectives of this lesson are as follows.

1. Understand the importance of conjugated double-bond systems in pigments.
2. Relate the first and second excited singlet states to a pigment's absorption spectrum.
3. Understand photophosphorylation as the coupling of photochemistry to photosynthetic electron transfer.
4. Describe the photosynthetic apparatus in terms of two photosystems.
5. Understand that CO_2 fixation relies upon the ATP and NADPH produced by photophosphorylation.

A bank of quiz questions focused on these objectives is part of this lesson. The lesson is written to target the educational needs of upper level undergraduate students and advanced extension audiences.

Key Words: photosynthetic pigments, chlorophyll, carotenoid, photophosphorylation, photosystems, light harvesting.

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