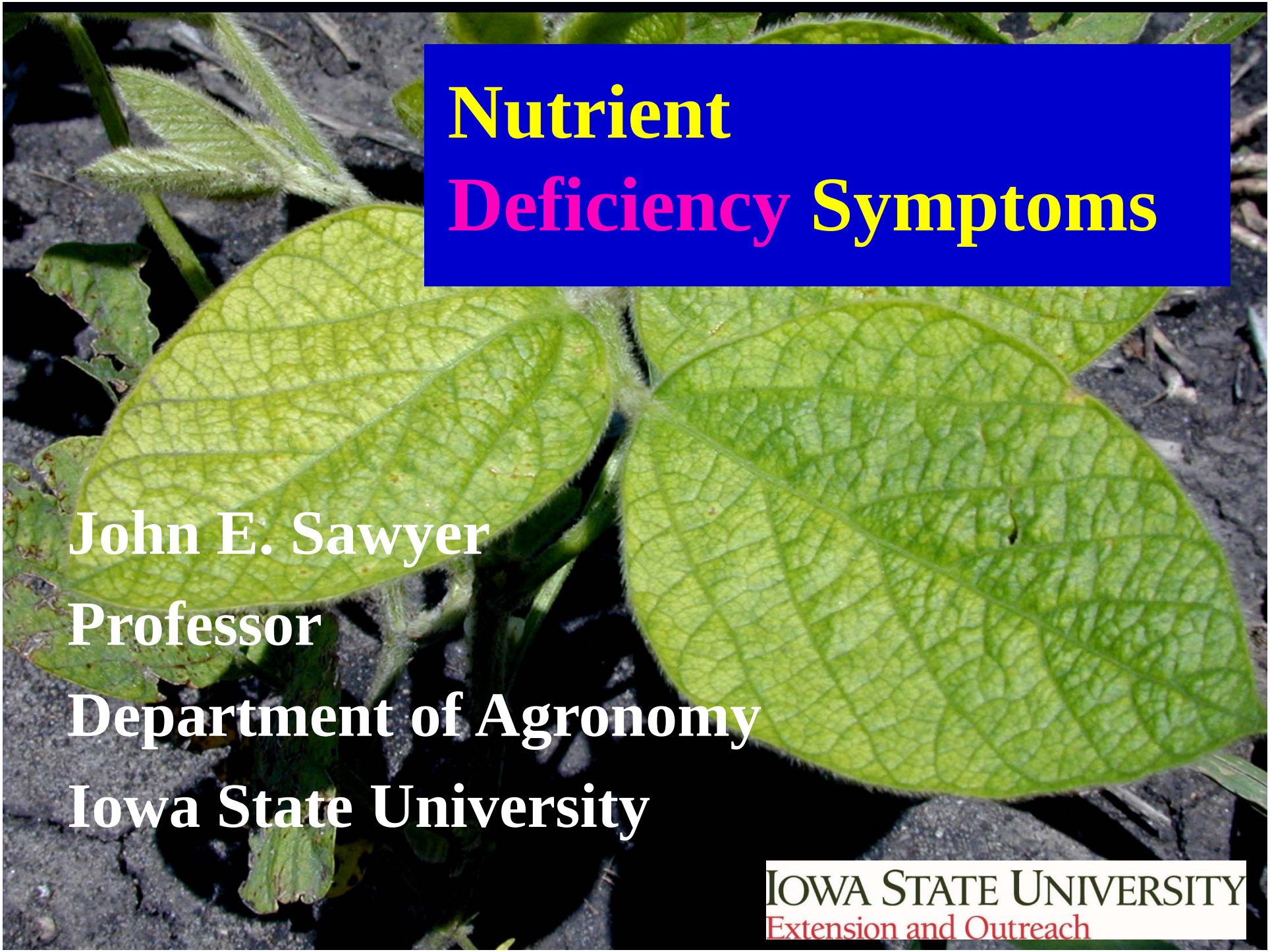

Nutrient Deficiency Symptoms

John E. Sawyer
Professor
Department of Agronomy
Iowa State University

IOWA STATE UNIVERSITY
Extension and Outreach

Sixteen Essential Elements

❖ Oxygen	45%	❖ Sulfur	1000 ppm
❖ Carbon	45%	❖ Chlorine	100 ppm
❖ Hydrogen	6%	❖ Iron	100 ppm
❖ Nitrogen	1.5%	❖ Boron	20 ppm
❖ Potassium	1.0%	❖ Manganese	50 ppm
❖ Calcium	0.5%	❖ Zinc	20 ppm
❖ Magnesium	0.2%	❖ Copper	6 ppm
❖ Phosphorus	0.2%	❖ Molybdenum	0.1 ppm
		❖ Nickel	<0.1 ppm

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Mobility of Nutrients in Plants

- Relates to location of deficiency symptom
  - Mobile
    - ✓ Nitrogen
    - ✓ Phosphorus
    - ✓ Potassium
    - ✓ Magnesium
  - Immobile
    - ✓ Boron
    - ✓ Calcium
    - ✓ Copper
    - ✓ Iron
    - ✓ Manganese
    - ✓ Molybdenum
    - ✓ Sulfur
    - ✓ Zinc

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Nutrient Deficiency Symptoms

- Insufficient amount of available nutrient in soil
  - ✓ Chemical characteristics of soil
- Nutrient positionally unavailable in soil
- Underdeveloped root system
  - ✓ Cool, wet, dry, compacted soil
- Root Injury
  - ✓ Mechanical, insect, disease, fertilizer
- Genetic makeup of plant

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Nitrogen
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Phosphorus

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Potassium
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June 22, 2002
J.E. Sawyer, Iowa State Univ.

July 18, 2002

J.E. Sawyer, Iowa State Univ.


Sulfur
Slide from B. Lang, Iowa State Univ.


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Iron
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Boron

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