Environmental Factors
Plant Growth Regulators - PIX

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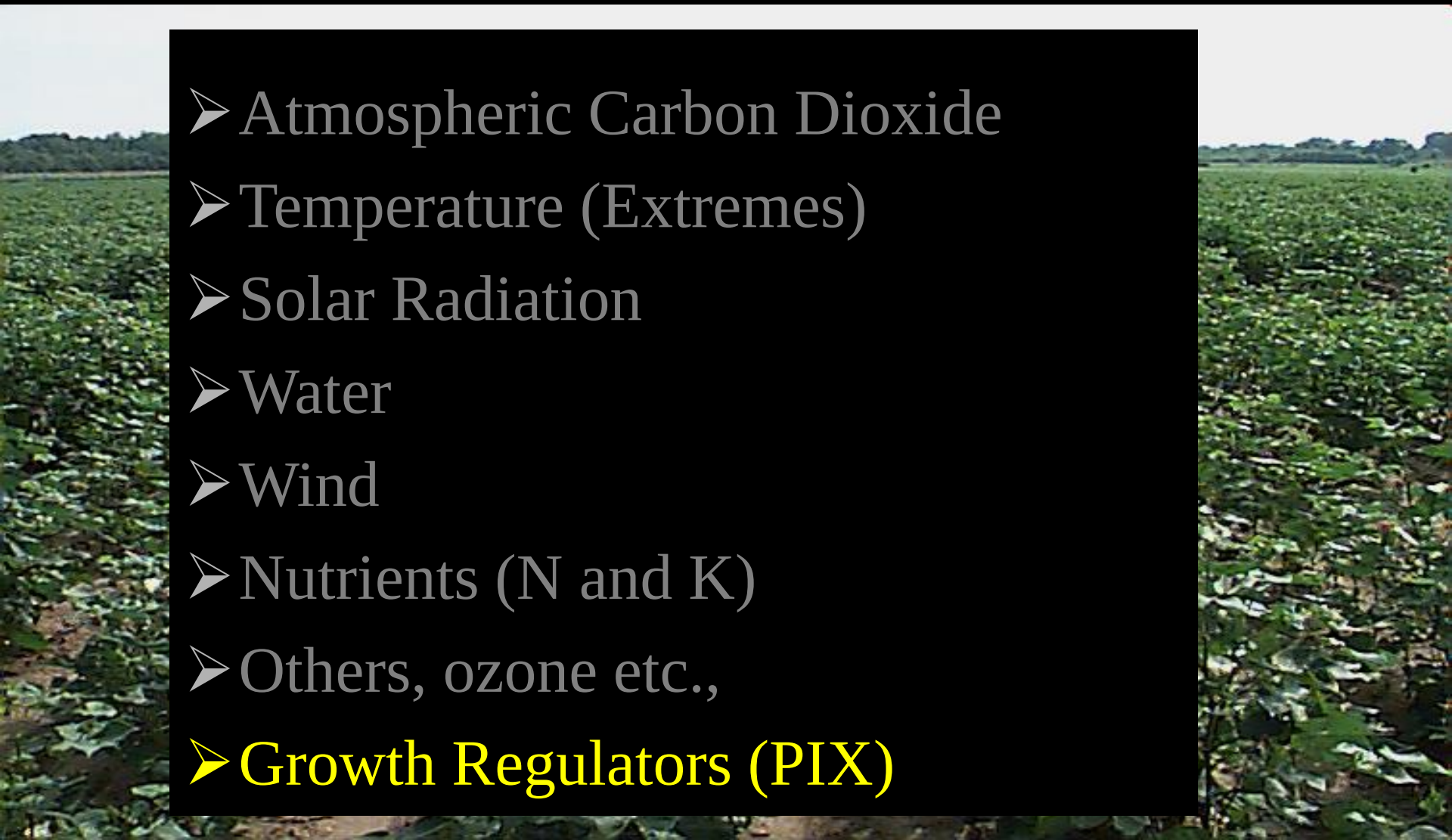
Environmental and Cultural Factors Limiting Potential Yields



- Atmospheric Carbon Dioxide
- Temperature (Extremes)
- Solar Radiation
- Water
- Wind
- Nutrients (N and K)
- Others, ozone etc.,
- Growth Regulators (PIX)

Introduction and Background

- Control of crop growth is a goal of many producers, particularly in cotton.
- Managing crop growth and development through plant growth regulators, retardants, yield enhancers and crop terminating chemicals gained momentum in recent years.

Table 1. Known regulatory activities of plant hormones (Modified from Leopold, 1987)

Developmental process	Auxins	Gibberellins	Cytokinins	Abscisic acid	Ethylene
Dormancy	X	X	X	X	
Juvenility	X	X			
Sex determination	X	X	X		X
Fruit set	X	X	X		X
Fruit growth	X	X	X		X
Fruit ripening	X	X	X		X
Tuberization	X	X	X	X	X
Rooting	X	X	X	X	X

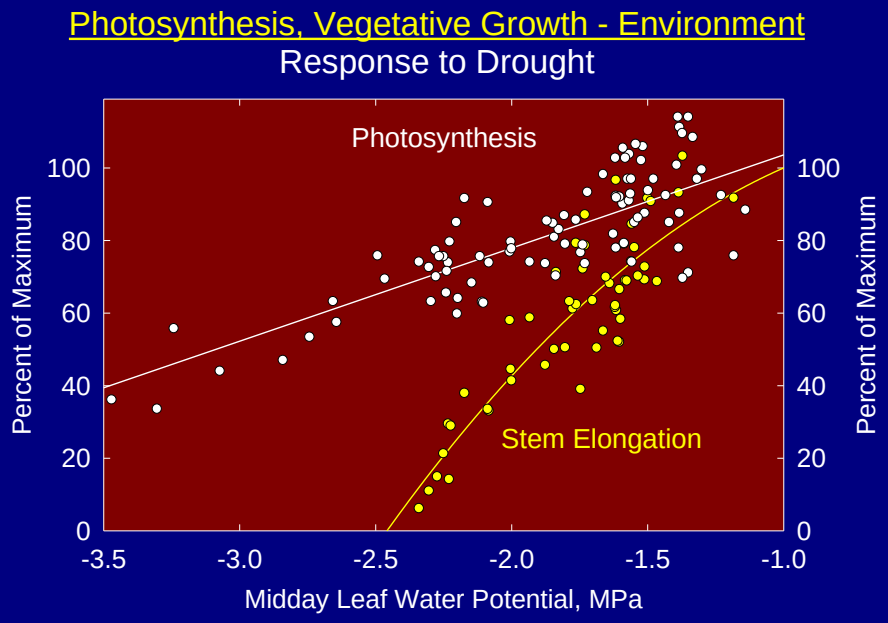
Introduction and Background

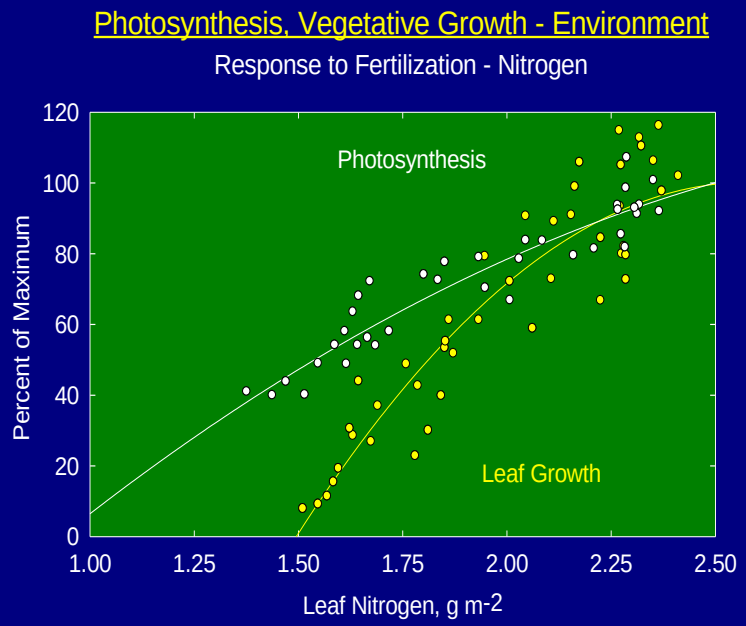
Areas of major emphasis for PGR research:

- Improved seed germination and seedling vigor.
- Early flower production and increased fruit retention.
- Improved canopy photosynthesis.
- Improved leaf and canopy water-use efficiencies.
- Improved partitioning between vegetative and reproductive growth.
- Altered nutrient uptake.
- Improved defoliation characteristics.

Introduction and Background

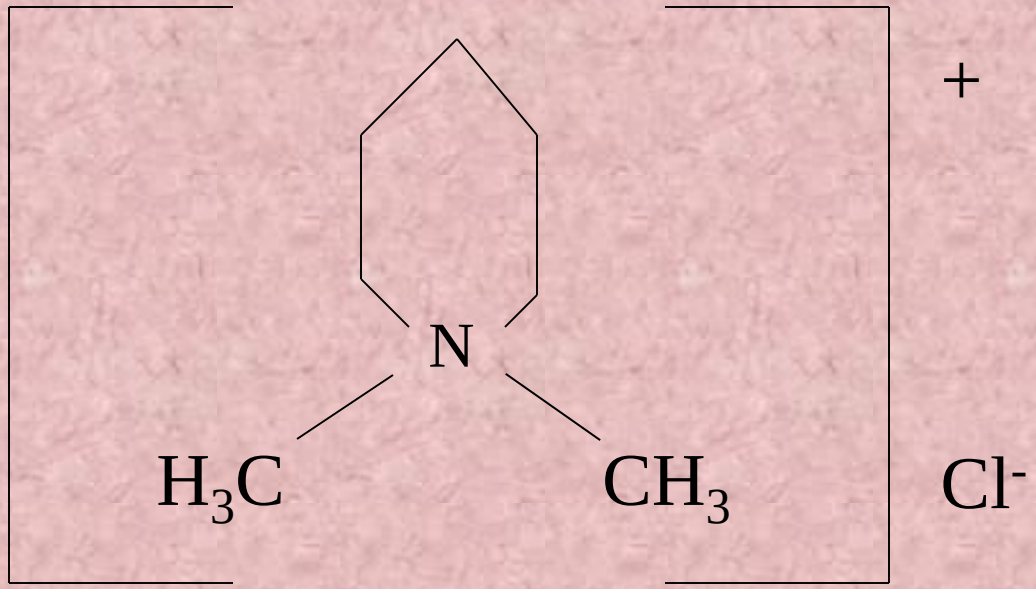
Growth control through stressing the crop (water or nutrients) has been shown to limit yield potential.





Introduction and Background

- Pix or Mepiquat chloride provides the cotton producer a tool to achieve proper balance between vegetative growth and reproductive growth without limiting yield potential.
- Mepiquat chloride or PIX contains the active ingredient 1, 1-dimethylepiperidium chloride.



Introduction and Background

- MC is included in the group of chemicals of inhibitors of the biosynthesis of gibberlic acid.
- The chemical is taken up mainly by the green parts of the plant.
- It is systemic in nature, and is translocated both upwards and downwards through both xylem and phloem.
- It is very stable in the plant tissue, and is lost only due to, or along with, abscission of plant parts.

Introduction and Background

- Many studies were conducted for the last two to three decades on MC and its effects on cotton growth and development.
- These studies have shown that MC suppresses vegetative growth by shortening the internodes and thus affecting plant height, and reducing the number of nodes and leaf area and photosynthesis.
- Yield responses to MC however, were inconsistent; from increases to no effect to decreases.

Introduction and Background

- These erratic yield responses to MC are probably due to many reasons.
- Amounts and timing of application of the chemical depend on plant size, growth rate, and changing growing conditions caused by unpredictable weather after the chemical application.

Managing Cotton with PIX

- All treatments were well-watered and well-fertilized.
- Pix was applied at match-head square.
- Pictures and plant height measurements were taken 4 weeks after treatment.

No PIX	8 oz PIX/a	16 oz PIX/a	32 oz PIX/a
Height, 56 in	35 in (37%)	33 in (41%)	29 in (48%)