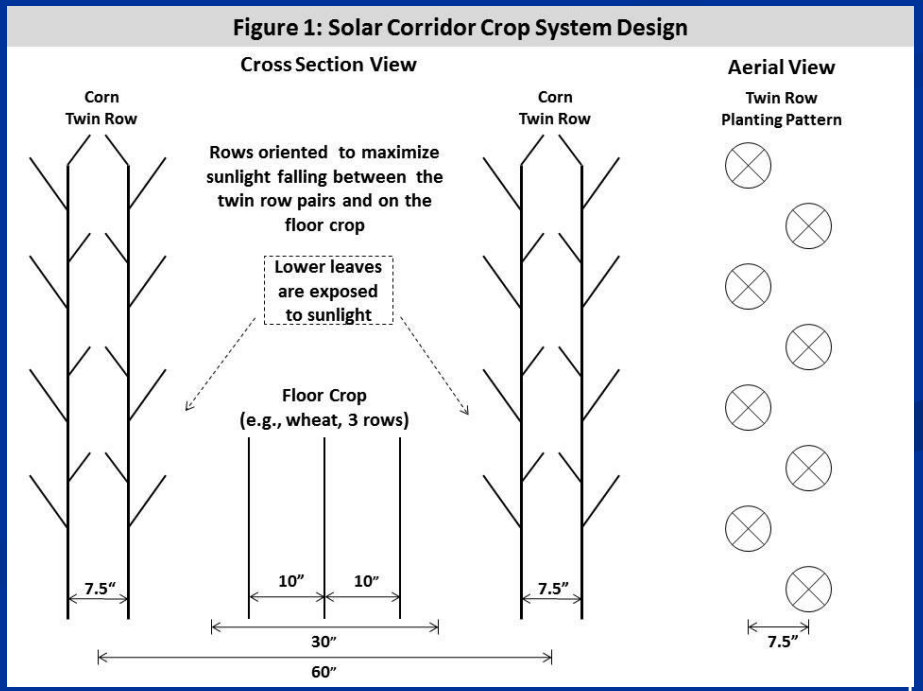
SUNLIGHT in Corn Production - A Paradigm Shift

The Solar Corridor

Corn rows spaced widely enough apart to enable sunlight to reach the lower leaves for the entire growing season



SUNLIGHT in Corn Production

A Paradigm Shift

- Corn rows spaced far enough apart to enable sunlight to reach the lower leaves for the entire growing season
- Enabling the bio capture of more CO2 for BioSynthesis into more photosynthate derived carbon compounds
- Grow a shorter symbiotic crop on the vacated row that completes its peak demand for sunlight before the corn plant begins its increasing demand for that light

The New Paradigm

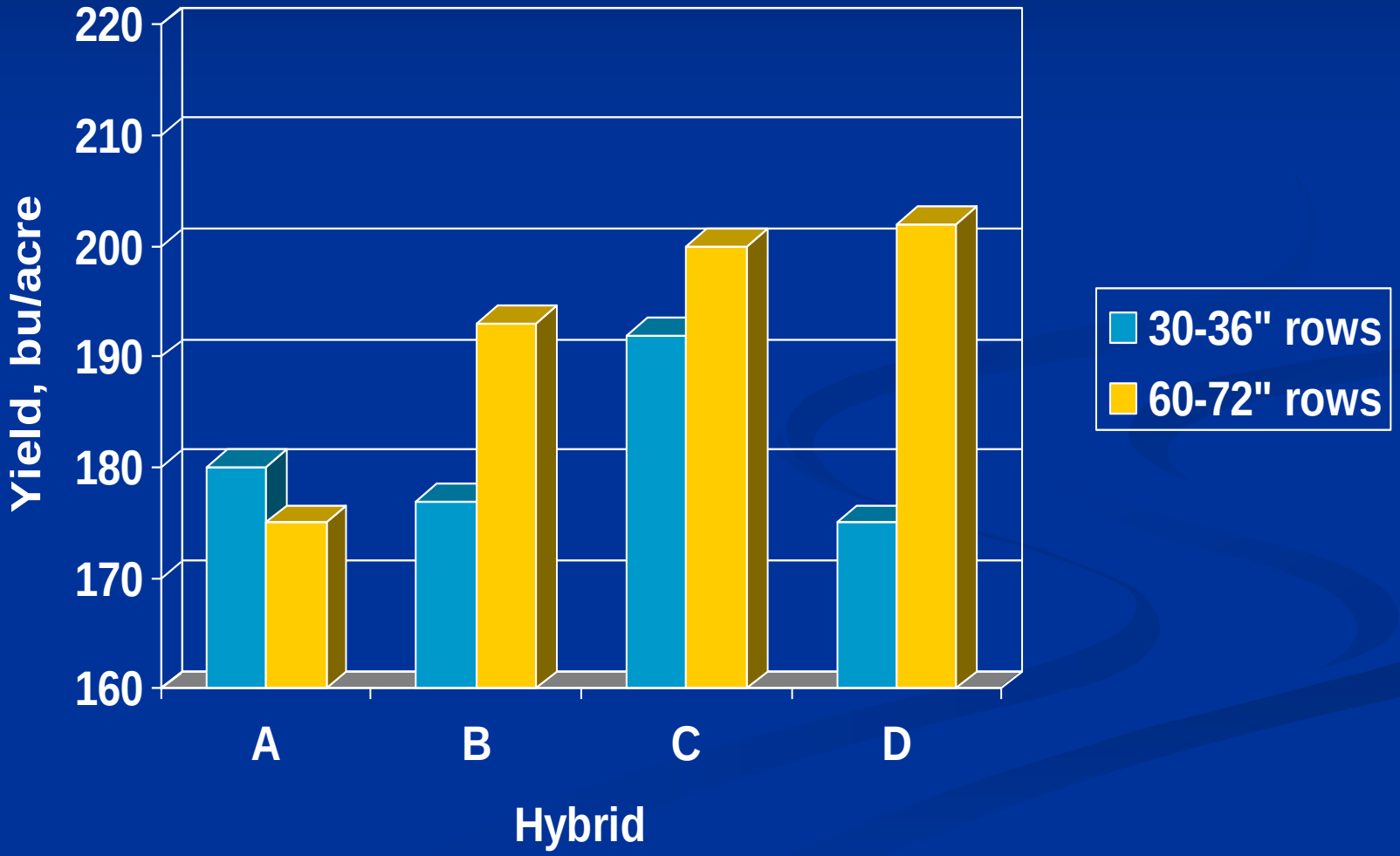
- Enables the mature chloroplasts to capture more CO2 and produce more photosynthates
- Enables the ***highest capacity*** reproductive sinks to access more photosynthates
- Enables vegetative sinks to access more photosynthates
- Cultivar and variety selection is site specific, production inputs then become variety specific

Treatments

- 12 Production Environments
- 4 Hybrids (Designated A, B, C, and D)
- 4 Plant populations
- 3 Replications
- Randomized Block Split/Split Plot design
  - 1st split by hybrid, 2nd by plant population
- 2 Row width entries
  - Control: Single rows on 30 or 36 inch centers
  - Treatment: Twin rows on 60 or 72 inch centers
- All treatments were in north/south rows between 40 and 41 degrees north latitude

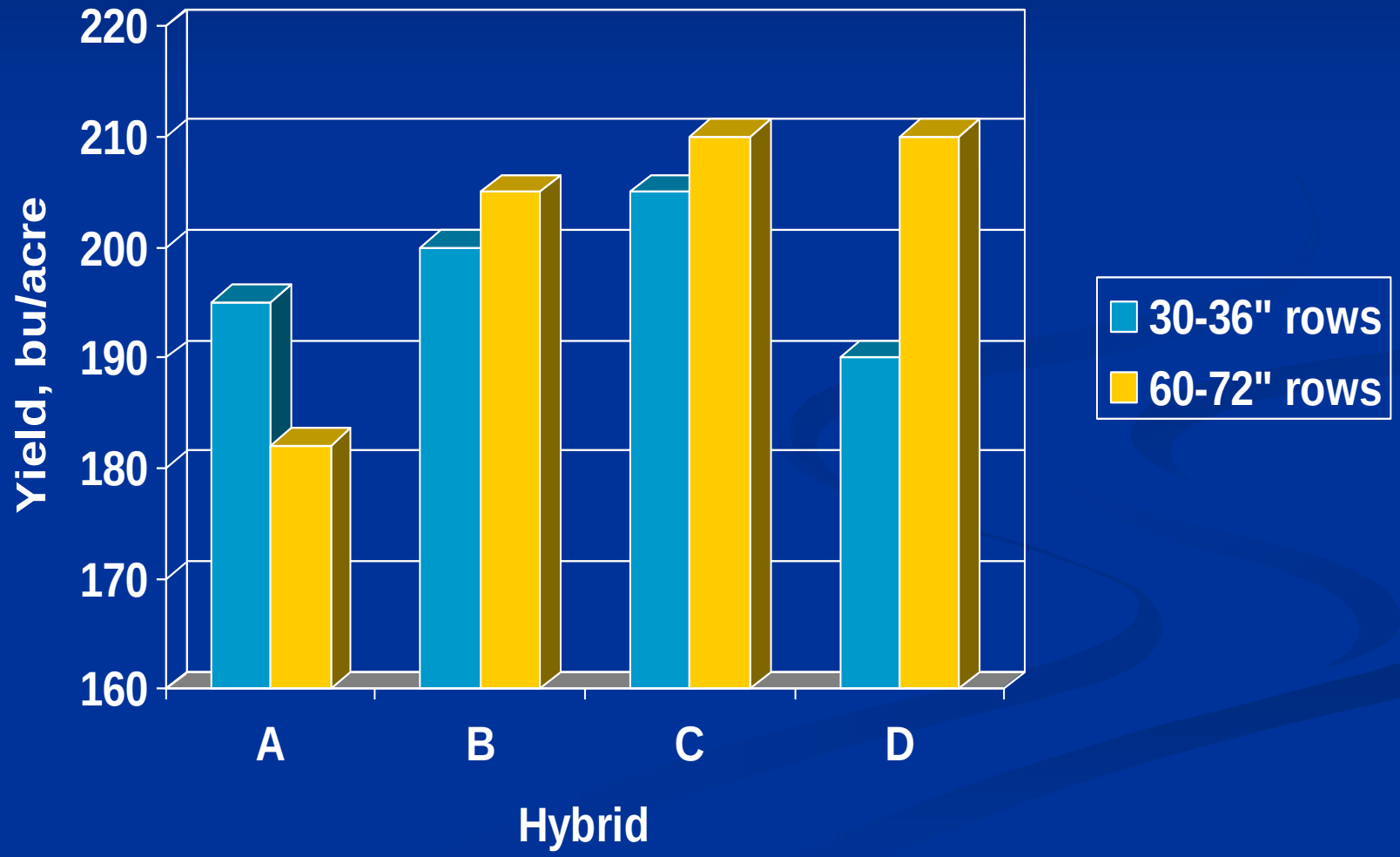
RESPONSE OF HYBRIDS TO ROW SPACING

Average Over 12 Environments And 4 Plant Populations



RESPONSE OF HYBRIDS TO ROW SPACING

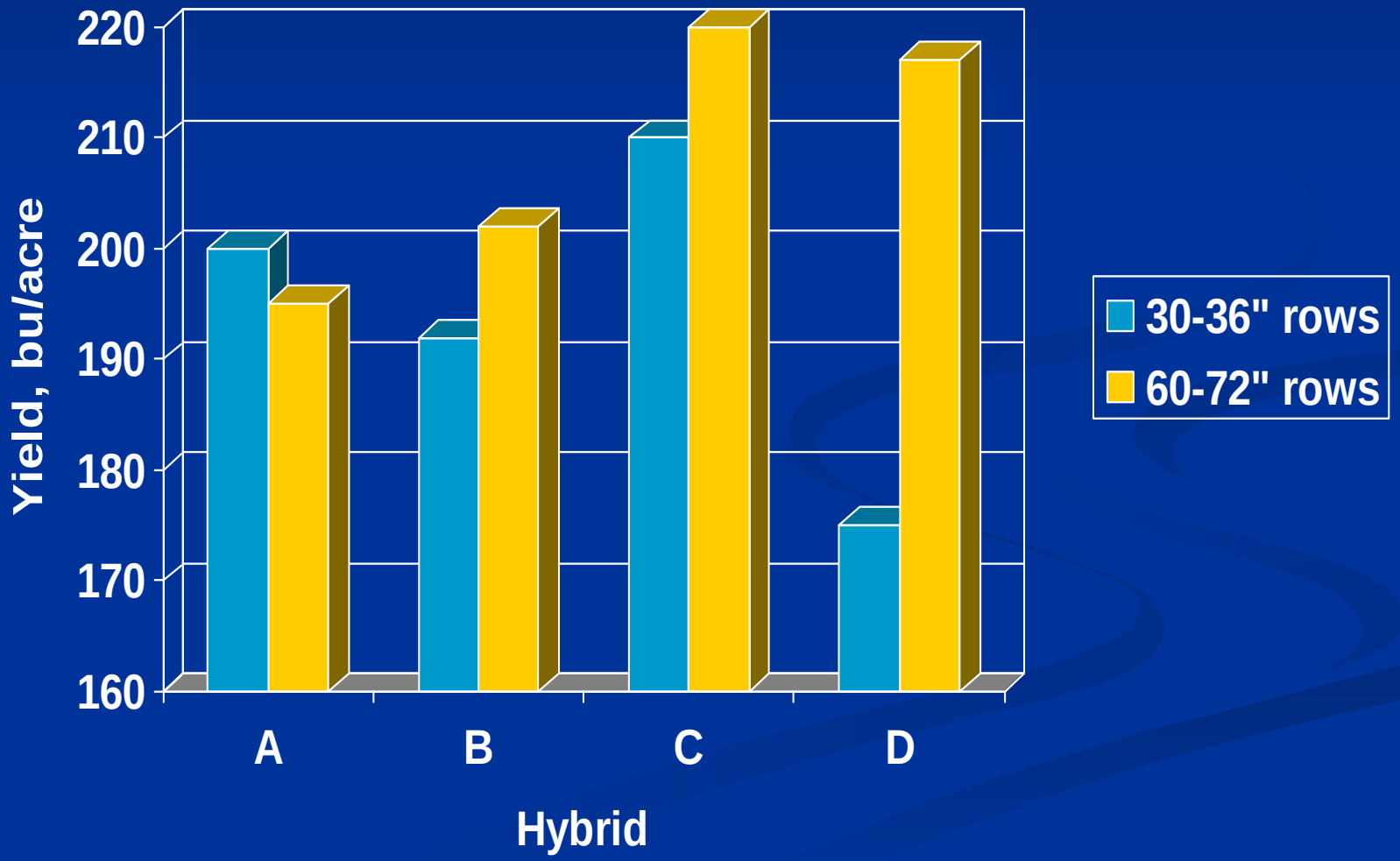
Average Over 8 Highest Yielding Environments And 4 Plant Populations



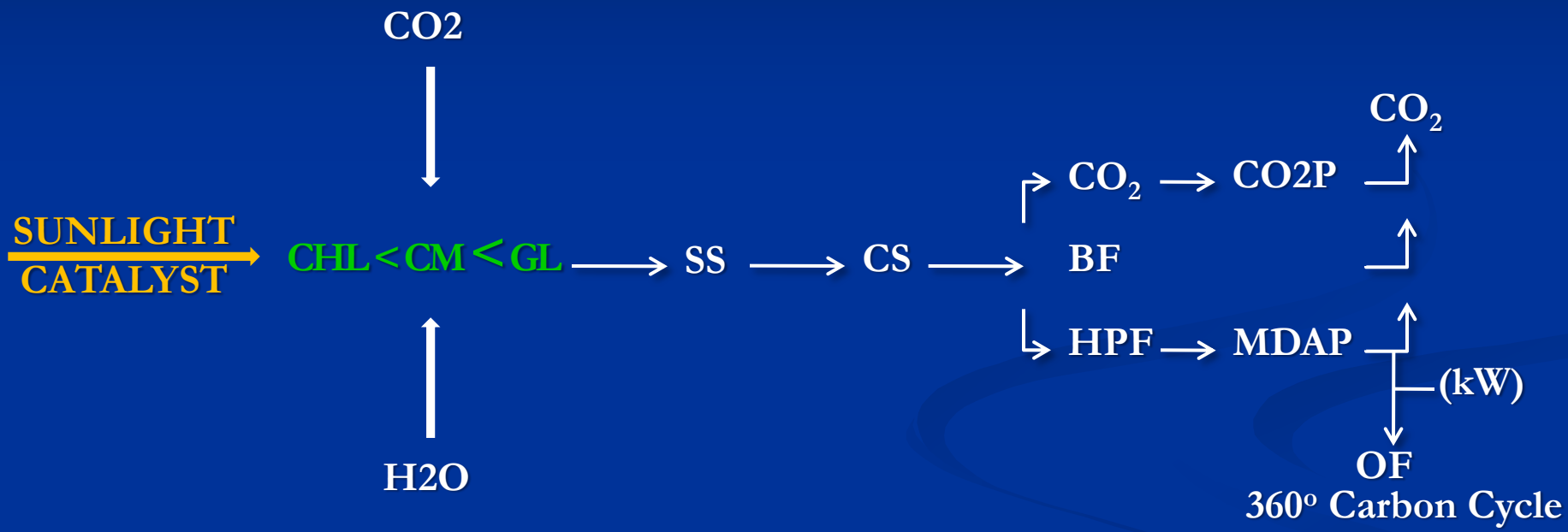
RESPONSE OF HYBRIDS TO ROW SPACING

Average Over All Locations

At Highest Yielding Plant Population (30,000)



Photosynthesis



CHL – Choroplast
CM – Chorophyll Molecule
GL – Green Leaf
SS – Simple Sugars
CS – Complex Sugars*

BF – Biofuels, including alcohols
HPF – High Protein (VM) Feed
MDAP – Meat, Dairy, and Animal Products
CO2P – CO_2 Sourced Products
OF – Organic Fertilizer

*The glucose molecules of amylose and the branched chain starch, amylopectin, are the specific sugars illustrated here. The cellulosic sugars are not included.

Summary and Conclusions

- Increased productivity can be achieved through the utilization of the Solar Corridor System
- Sunlight is made available to more chloroplasts to produce more carbohydrates to meet sink demands through physiological maturity
- Appropriately selected site specific supporting practices maximize Solar Corridor benefits
  - Reduced Lodging and Soil Erosion
  - Increased Yield and Sequestration of CO2
- Solar Corridor floor crop harvest options do exist
  - We need to further develop and refine these options

Summary and Conclusions (cont.)

Based on the performance data presented, the increased biosynthesis of the atmospheric CO2 currently available in the US heartland resulting from the full deployment of the proposed new paradigm:

- Can produce another 30bb annual gal of anhydrous equivalent alcohol fuels,
- Plus significant quantities of clean substitutes for diesel fuel, natural gas, glycerol to power electric generators, high energy protein, etc.,
- Without using any of our current corn-based food supply, cellulosic feedstock, or increasing corn (or total crop) acres,
- While increasing sequestration of CO2.