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Texas A&M System

High Biomass Energy Crops for U.S. Energy Security

SO-09-129 Hammond
TAMUS--00467

VISIONS for BIOFUEL PRODUCTION:

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"Energy Sorghum" Hybrids:

- Available NOW
- Non-GMO
- Seed-based high-yielding
- Lignocellulosic- and/or sugar-based

"SorCanes":

- 2 suites of new crops, created by novel "wide hybridization" technology (non-GMO):

1. Clone-based "cane" planting / near-term
2. Seed-based planting / mid-term

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PROJECT GOALS:

1. **Optimize production of *existing* energy sorghum hybrids in locations of national security importance.**

2. **Produce next generation energy sorghum hybrids with higher biomass yield and improved composition for biofuels production.**

3. **Create new energy crops using novel wide-hybridization technology that enables sorghum to be crossed to cane and other energy grasses.**

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GOAL 1: Optimize production of energy sorghum hybrids in locations of national security importance.

Deliverable: Energy sorghum hybrid production and economic assessment in three locations of national security importance using optimized crop management practices and harvest logistics.

Metric: 10-15 dry tons of lignocellulosic biomass produced per acre per year delivered to biorefineries at ~$60/dT providing ~75% GHG offset for biofuels or ~95% for biopower

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Energy Sorghum (2008)

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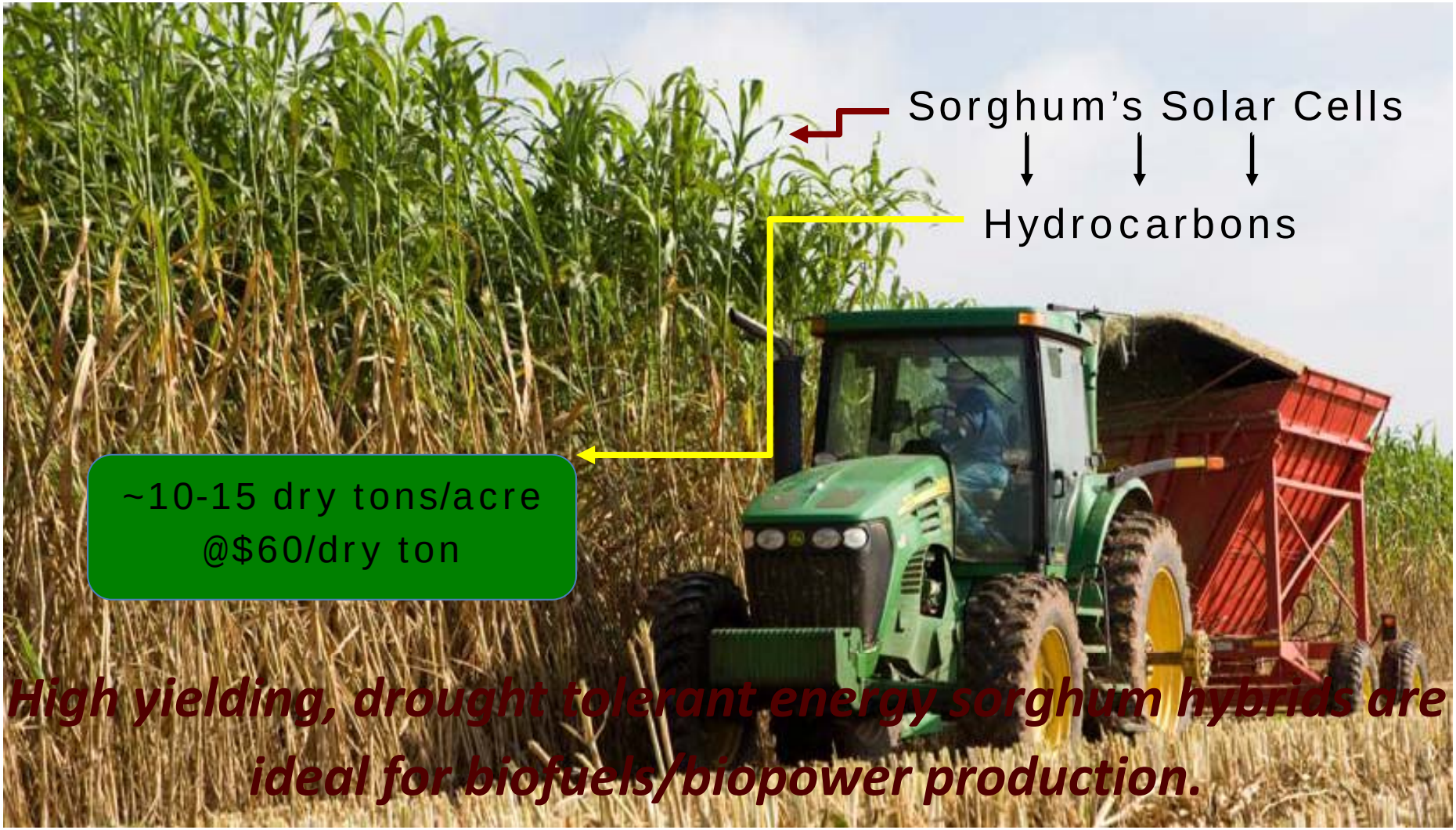

High yielding, drought tolerant energy sorghum hybrids are ideal for biofuels/biopower production.

Level

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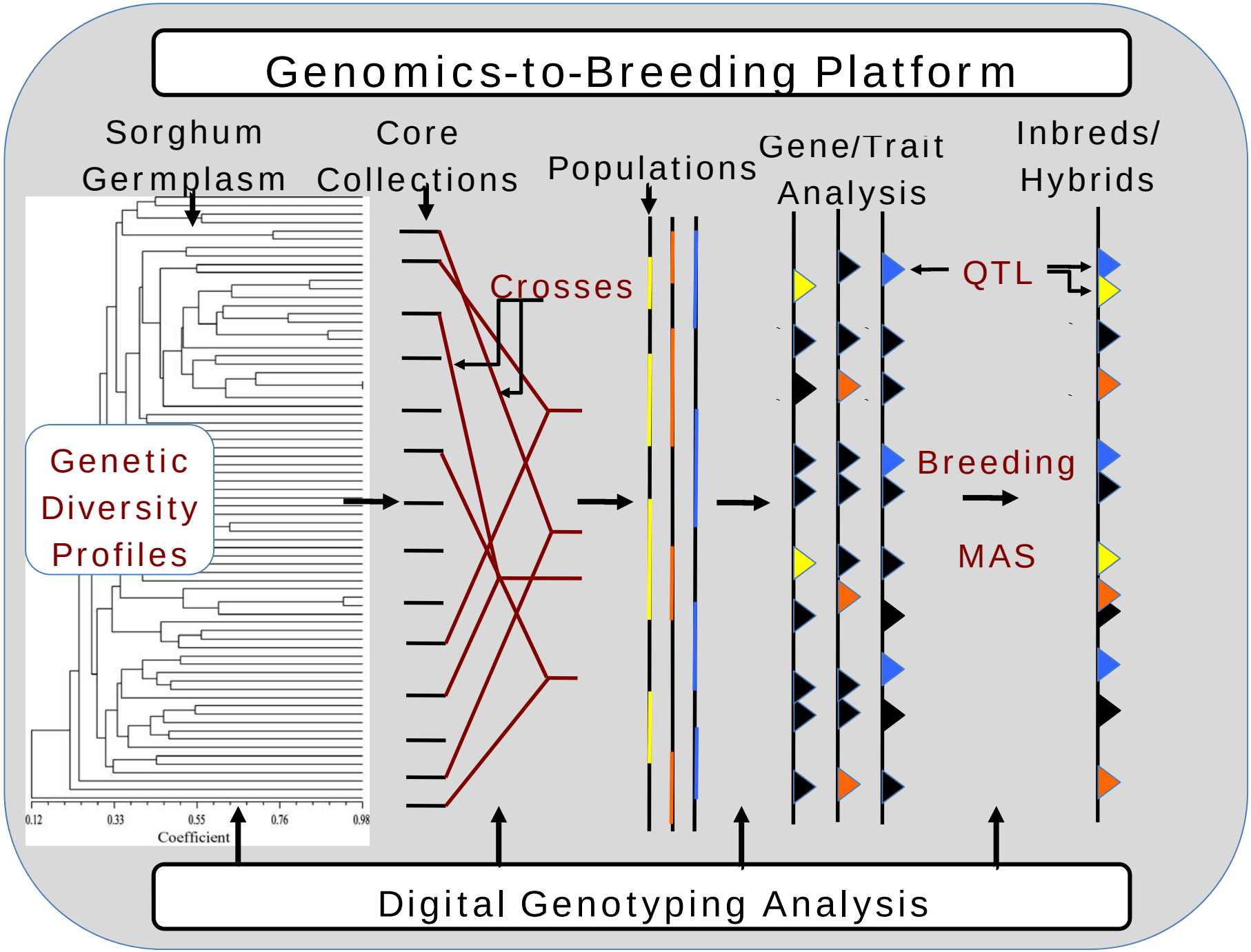
GOAL 2: **Produce next generation energy sorghum hybrids with higher biomass yield and improved composition for biofuels production.**

Deliverable: Energy sorghum hybrids with increased biomass yield and improved composition designed using an integrated genomics-to-breeding technology platform.

Metric: Energy sorghum hybrids yielding 15-20 dT/acre under good conditions with improved biomass composition that increases the yield of biofuels per dry ton.



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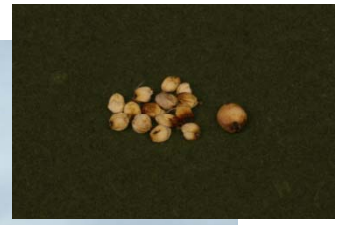
GOAL 3: **Create novel energy crops using wide hybridization technology that enables sorghum to be crossed to cane and other energy grasses.**

Deliverable: Novel wide-hybrid sorcane energy crops propagated vegetatively and/or through seed production and an understanding of the genetic basis of wide hybridization.

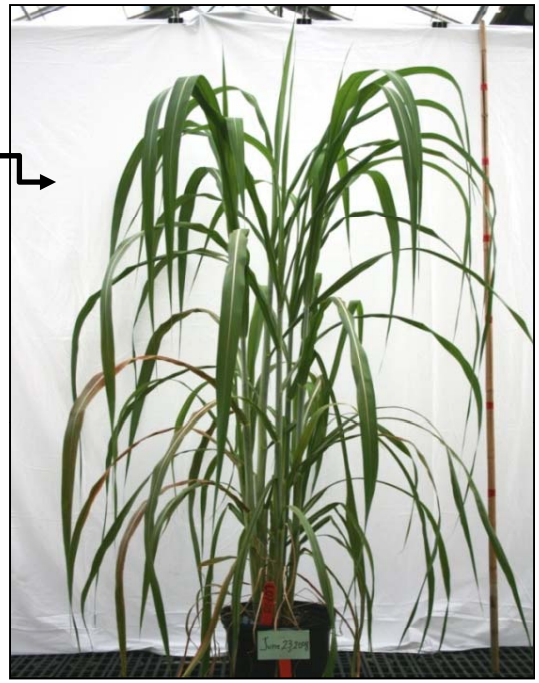
Metrics: [1] Totally new wide-hybrid energy crops with high yield and will be generated, and [2] Methods for mass-producing wide hybrid seed will be developed.

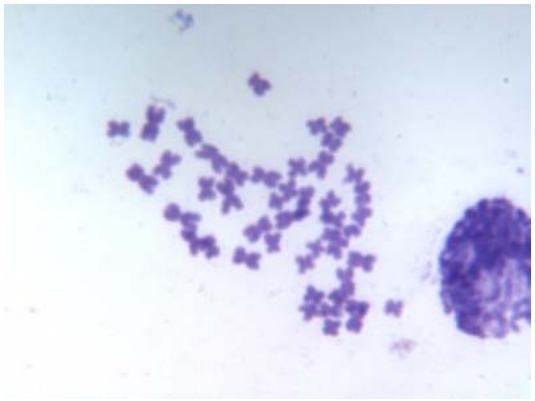
Sorghum X Sugarcane (2006-2008)

Sorghum X Cane Crosses



Sorcane





SUCCESS!!!

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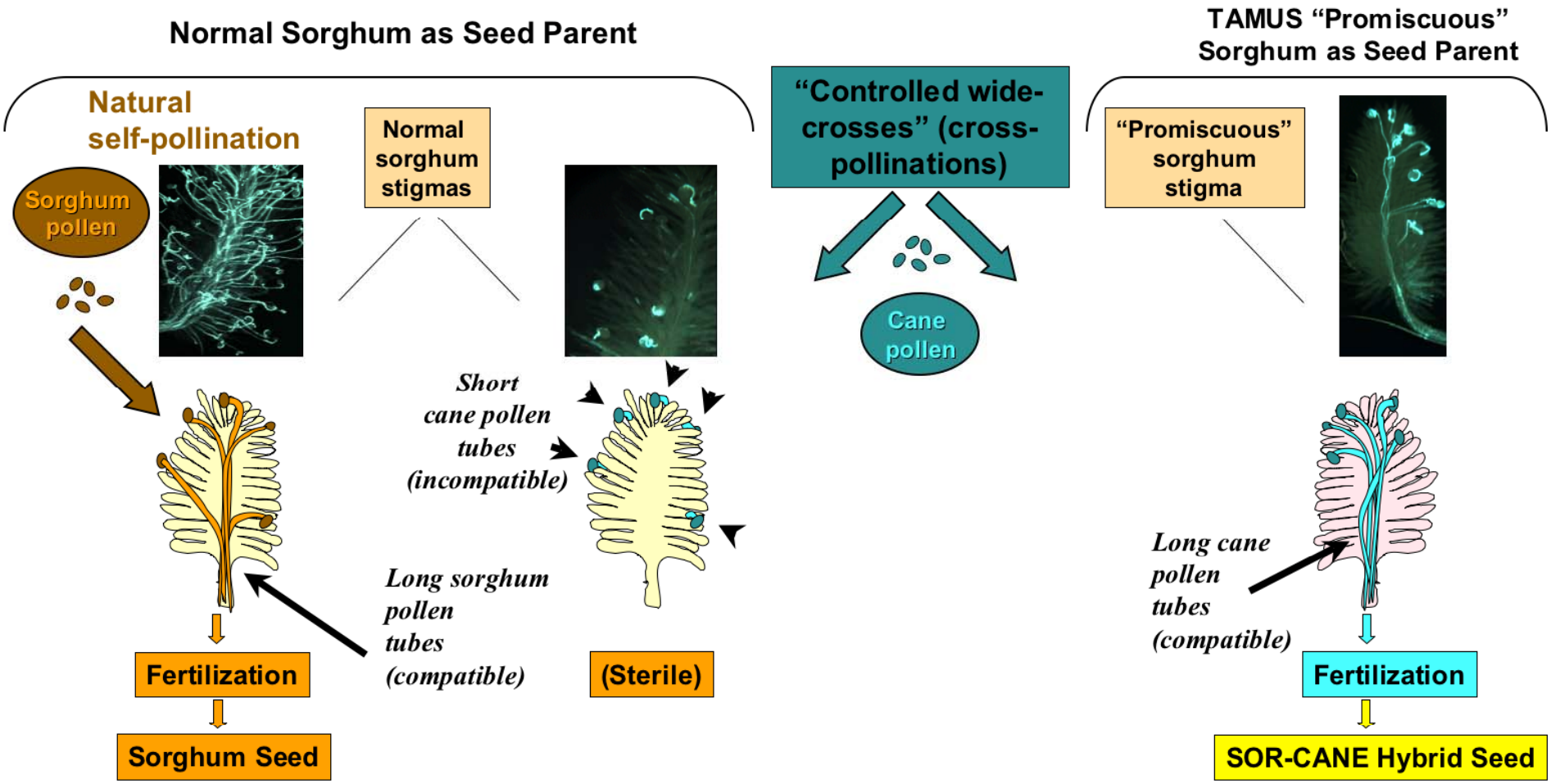

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GOAL 3: Create novel energy crops using wide hybridization technology.

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Deliverables:

- Ability to create & screen 1000s of *Sorghum*/*Saccharum* hybrids (SorCanes).
- Chromosome [redacted]
- Evaluation of initial wide-hybrids
- Improved [redacted]; Creating better *SorCanes*

GOAL 3: Create novel energy crops using wide hybridization technology.

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Metrics:

- Create & screen 1000s of *Sorghum*/*Saccharum* hybrids; select top ~1% (30-50) and ~10% (300-500) "cuts".
- Sorghum/Sorghum crosses to improve [redacted]
- Chromosome-[redacted]
- Evaluation of initial wave of wide-hybrids
- Creation of improved wide-hybrids using improved parents and parental combinations

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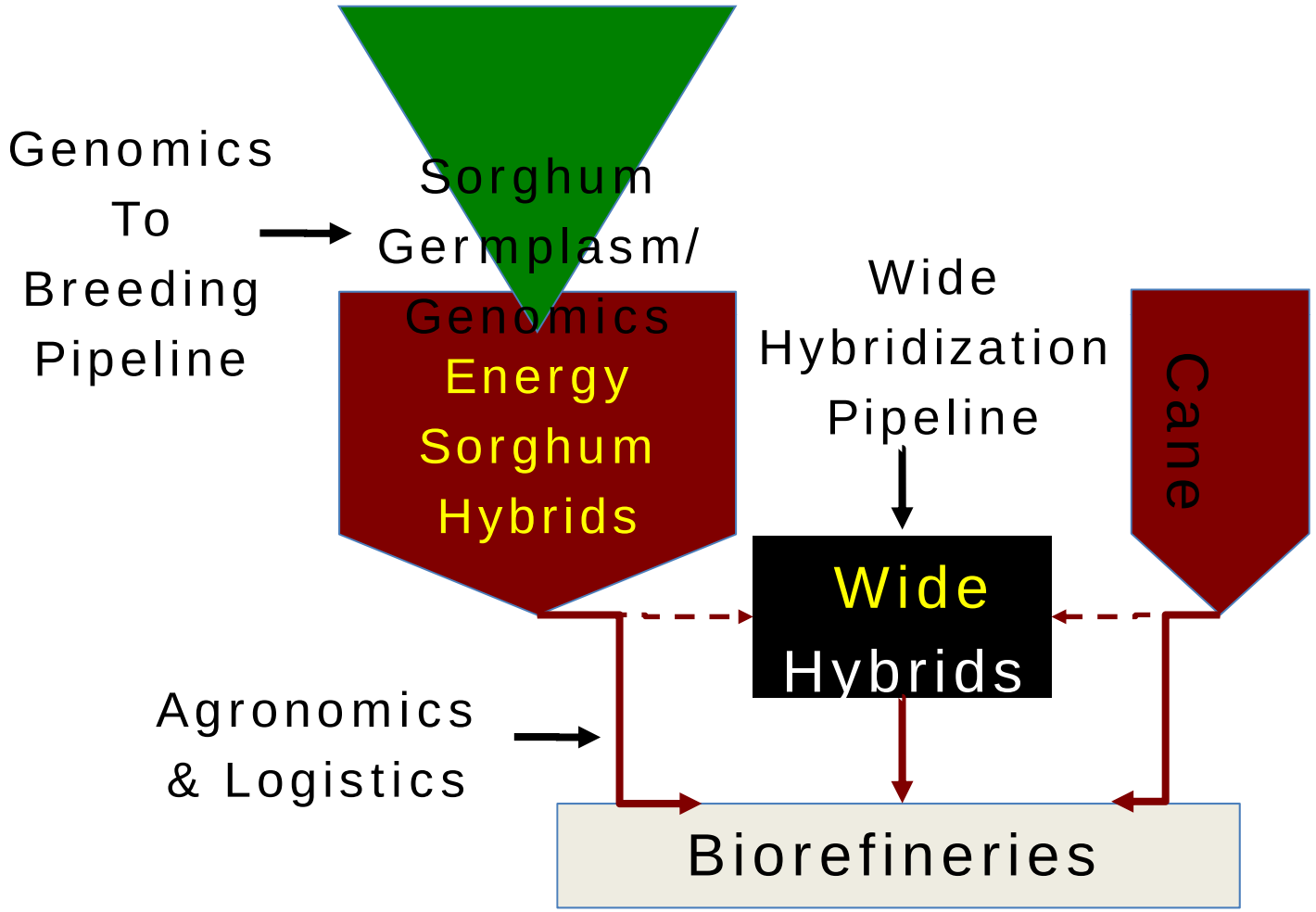
Two Synergistic Pipelines for Energy Crop Development



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