Selection and Use of Native Grasses for Biomass Feedstocks

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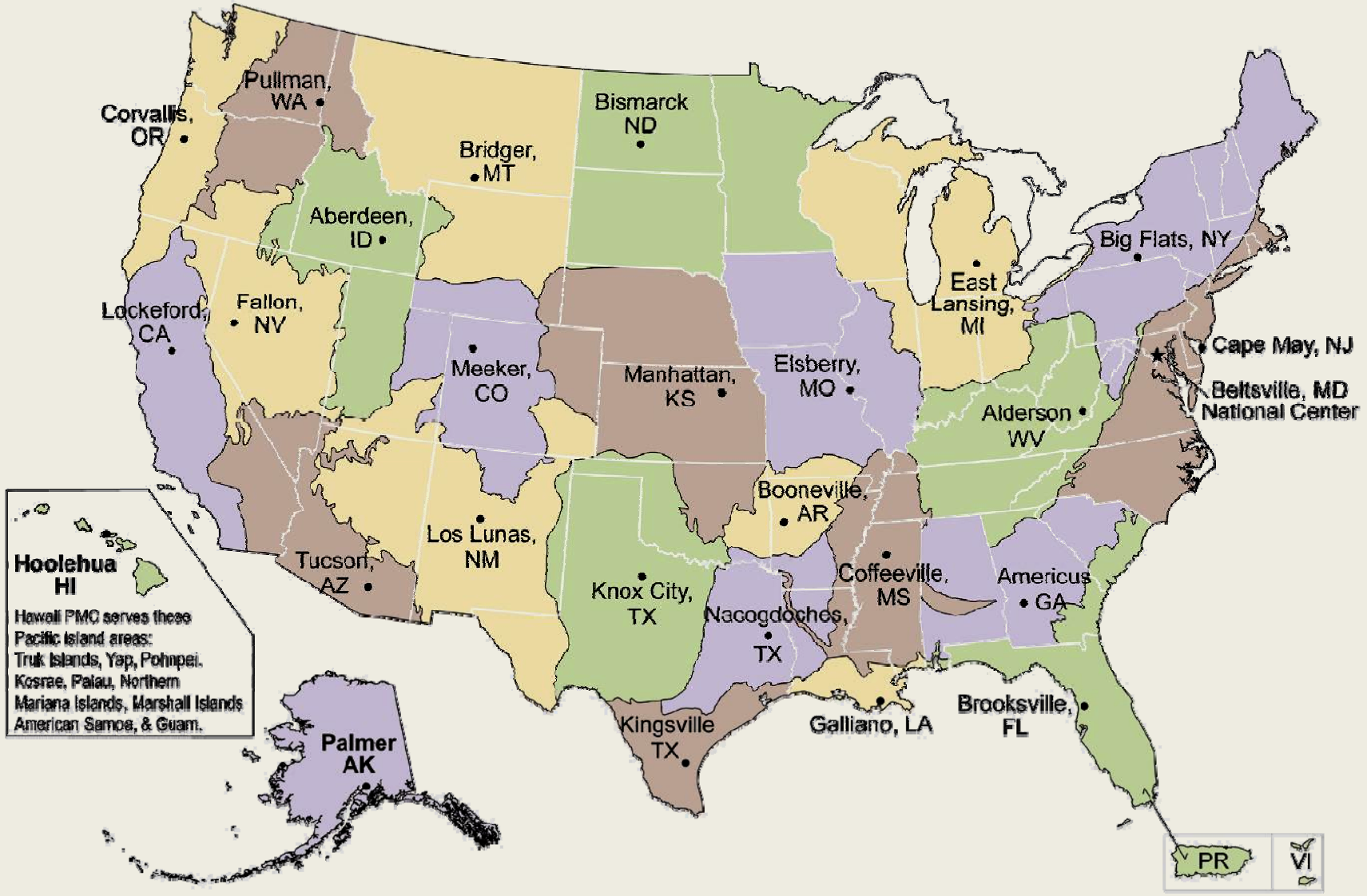
The Plant Materials Program

- We are a **network** of Plant Materials Centers and Plant Materials Specialists strategically located throughout the United States.
- We **select plants and develop plant technology** for the successful conservation of our nation's natural resources.
- We **provide information** to private landowners who need assistance in addressing critical land management problems.

Locations of Plant Materials Centers



Biofeedstock Characteristics

- Fast growing
- Perennial
- Efficient use of inputs
- Highly productive
- High quality
- Agronomically viable
- Environmentally compatible

Candidate Biofeedstocks

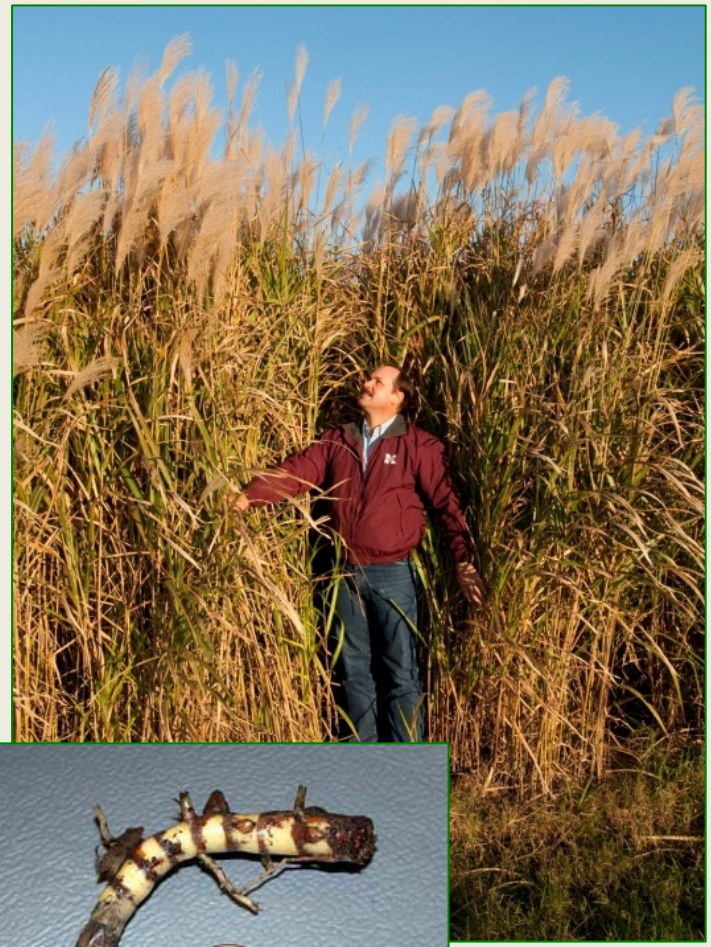
- Sorghum & Sudangrass
- Arundo donax (giant cane)
- Bahiagrass & Bermudagrass
- Giant Miscanthus
- Switchgrass
- Indiangrass, Big Bluestem, Little Bluestem
- Prairie Cordgrass

Bermudagrass

- ✚ Multi-use, existing production
- ✚ Conventional equipment
- ▬ High inputs required
- ▬ Difficult to harvest
- ▬ Low productivity as a biomass crop
- ▬ Poor quality

Giant Miscanthus

- \+ High productivity,
- \+ sterile
- \+ Low input production
- − Low mineral content
- − Vegetatively propagated
- − Low wildlife value
- − Current breeding work to eliminate sterility
- Potential weediness



Switchgrass

- Easy to seed and harvest
- Long lived, perennial
- Low input production
- Multiple uses
- Very adaptable
- May be slow to establish

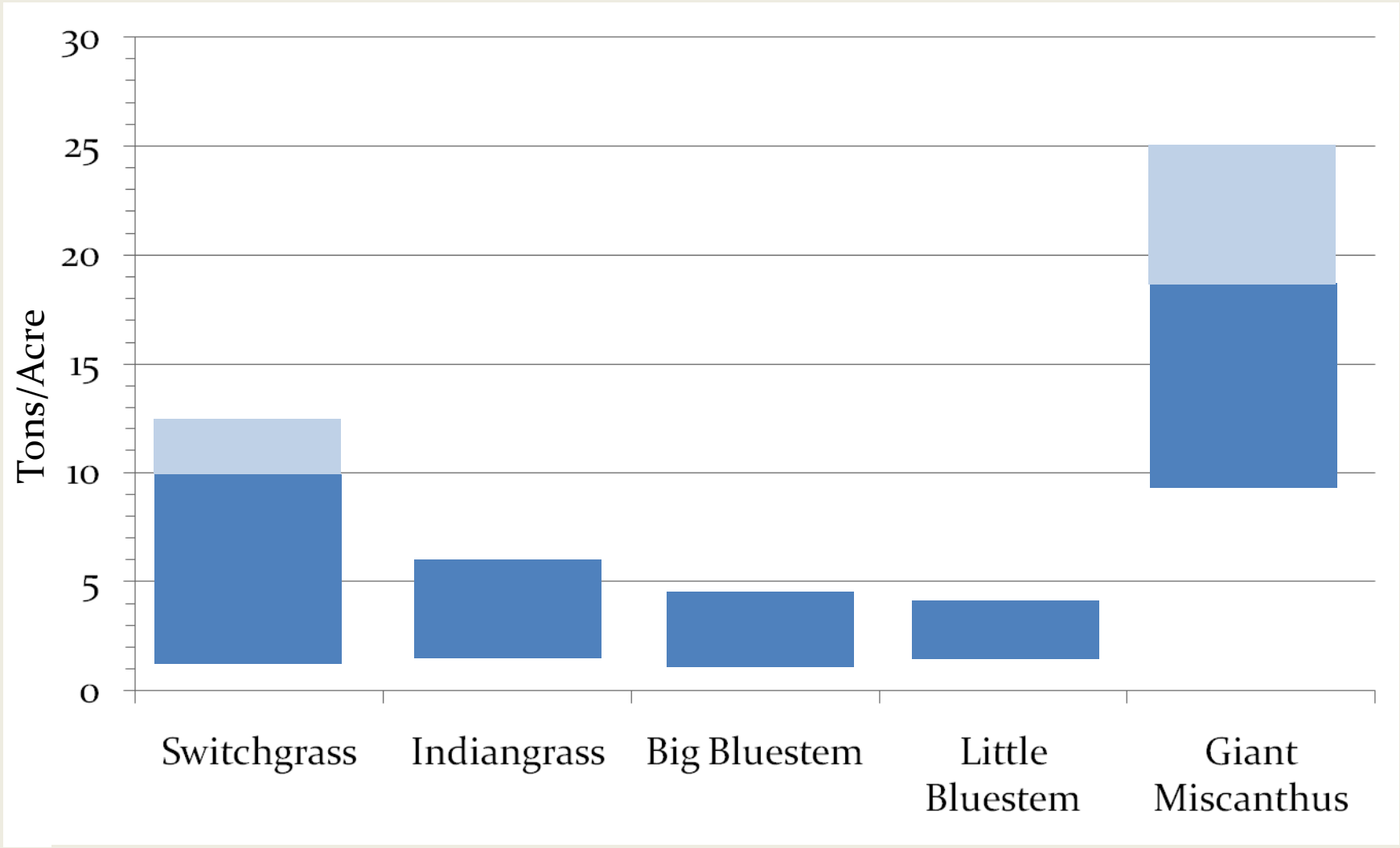
Other Native WSGs

Indiangrass, Big Bluestem, Little Bluestem

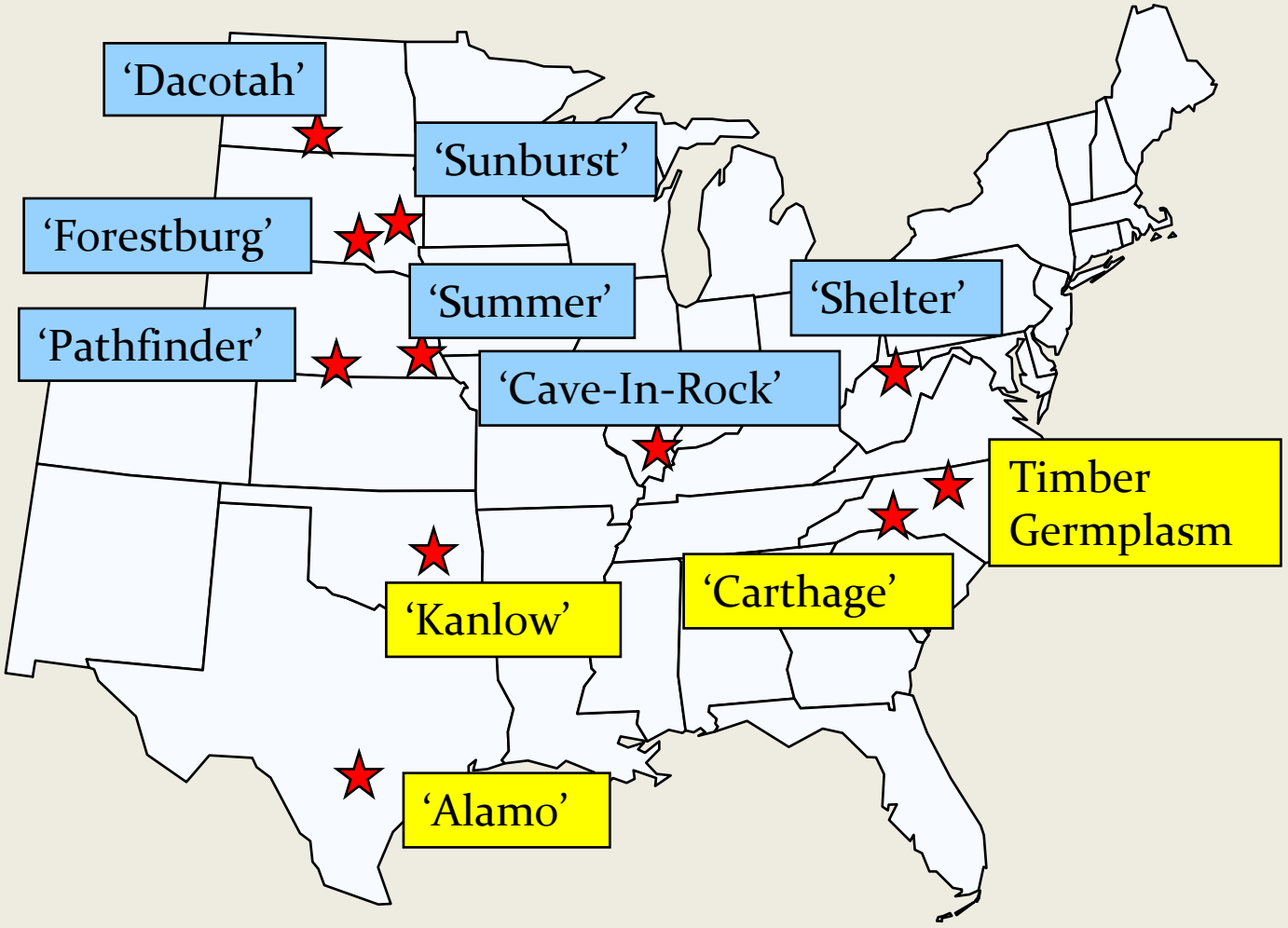
Similar qualities to Switchgrass

- Many different cultivars and selections
- Seeding may require specialized equipment

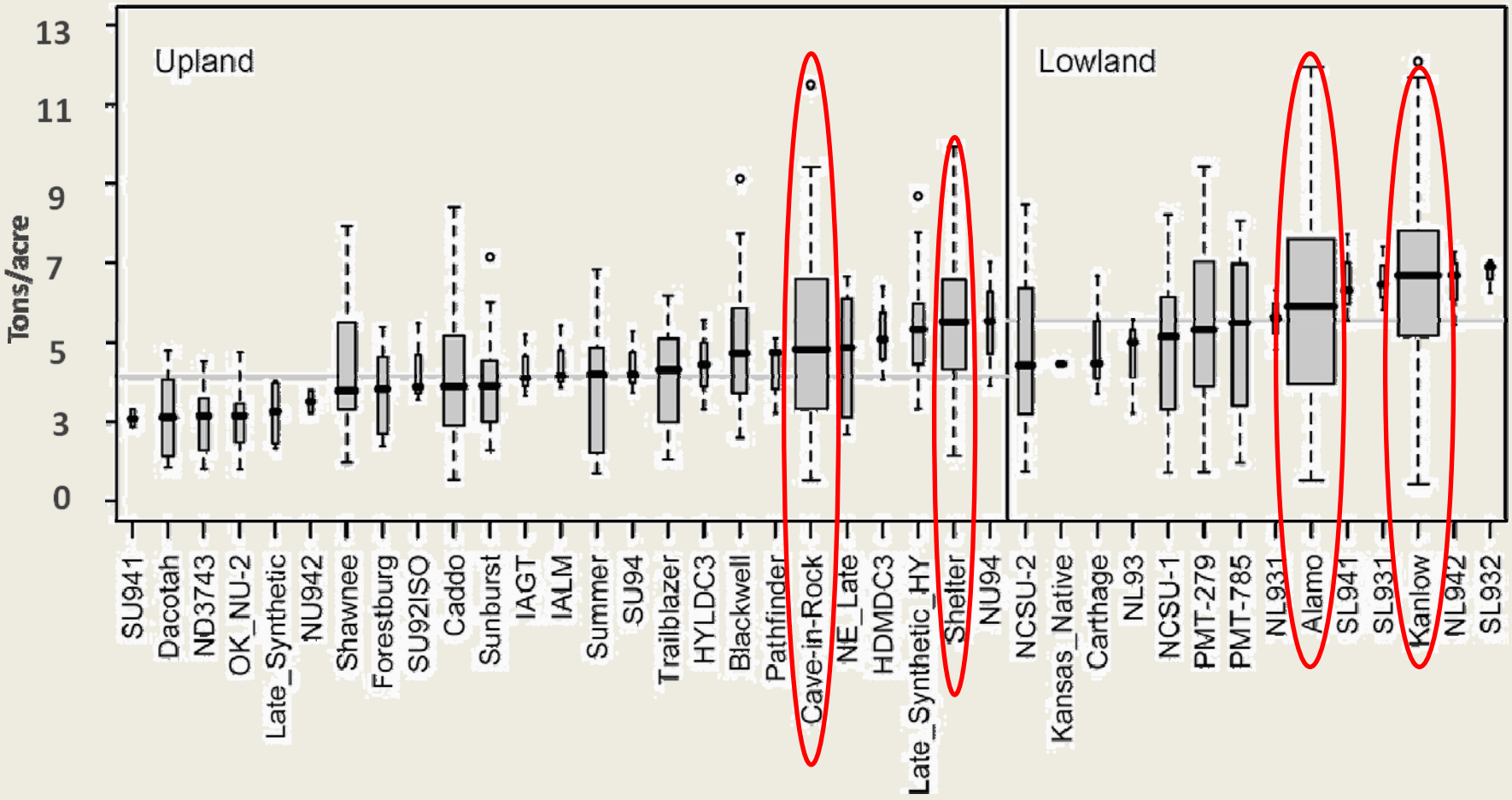
Average Yields



Switchgrass Cultivars

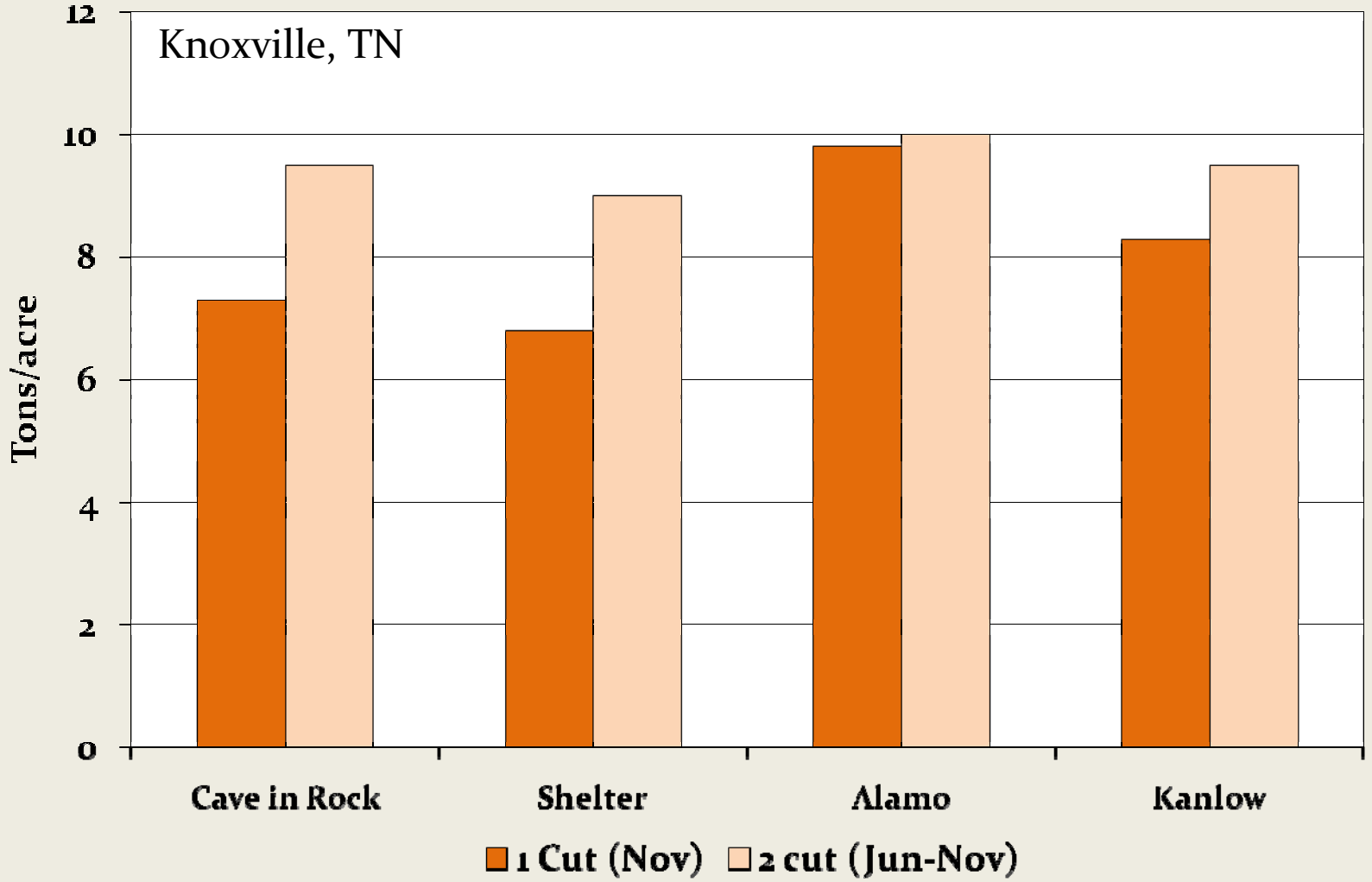


Switchgrass Cultivar Performance



From Wullschleger, et.al., 2010, Agronomy Journal 102(4).

Harvest Frequency of Switchgrass



Adapted from Fike et al., 2006

Advantages of Single Harvest

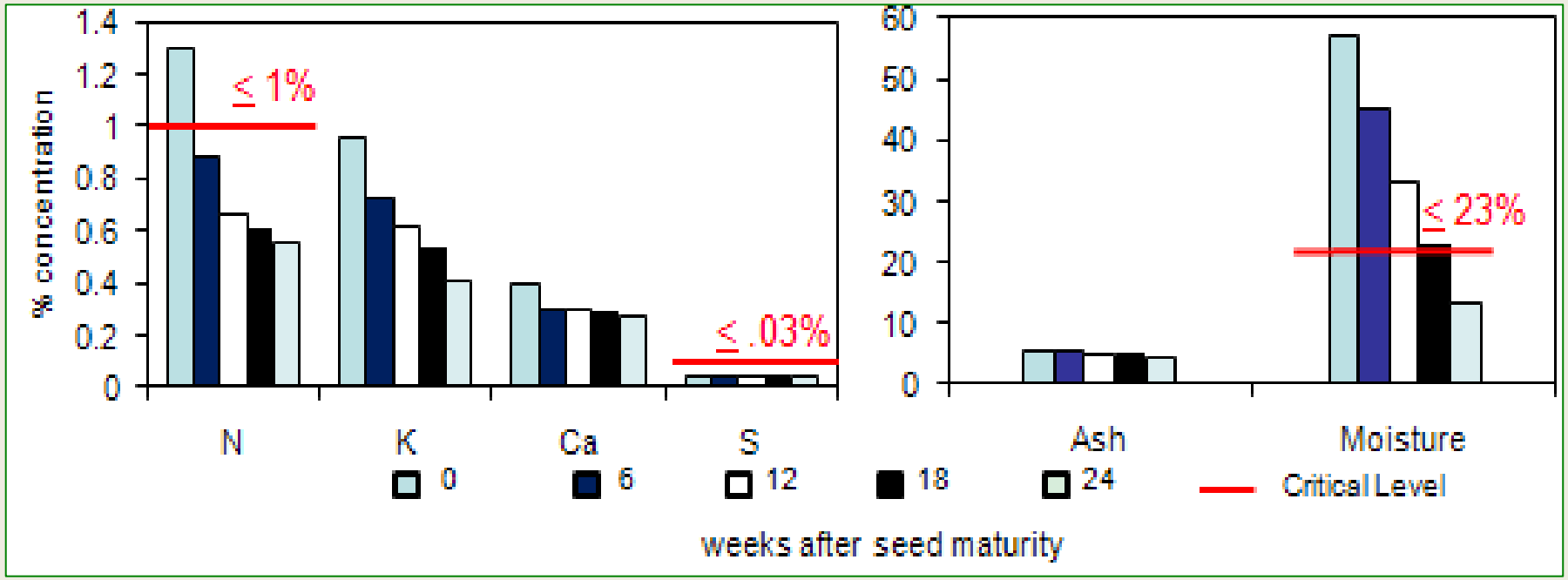
- Lowland cultivars produce well
- Late fall or early winter harvest requires less energy
- Maximizes biomass production
- Allows for translocation of nutrients to crown and roots
- N and other nutrient conservation strategy
- Improve biomass quality for direct combustion

Feedstock for Direct Combustion

- Requires specific feedstock quality
- Low nutrients (N, K, Ca, S, Cl), moisture, and ash required to reduce direct combustion system failure

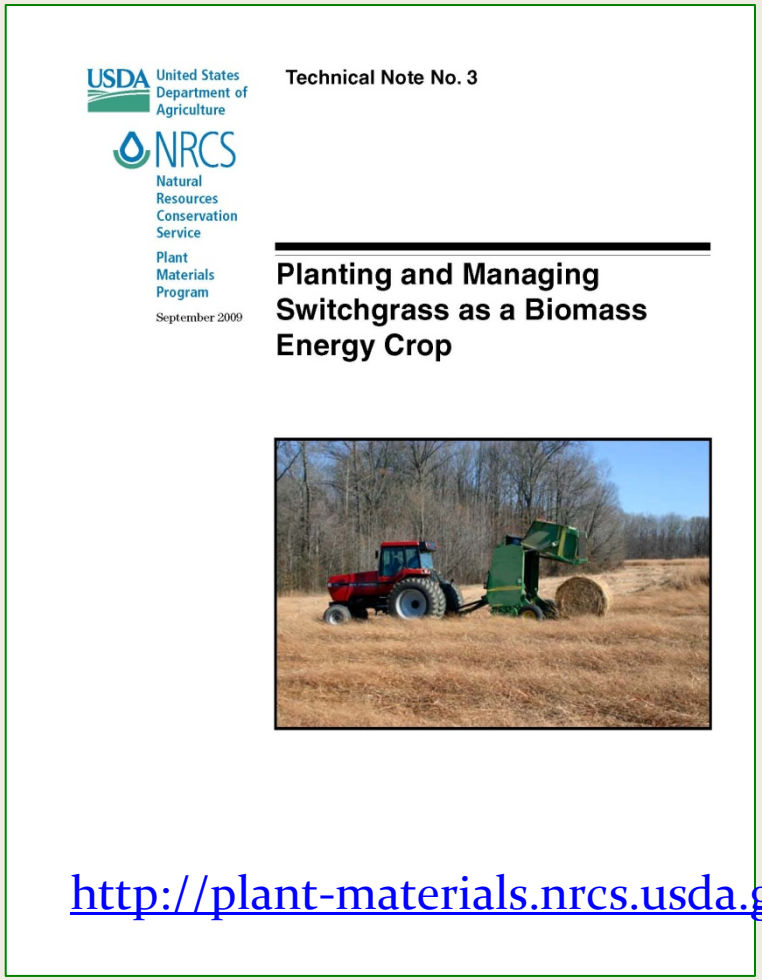
Effect of Environment on Harvestable Biomass of Switchgrass

Effective of Harvest Timing on Biofuel Quality of Alamo Switchgrass



Critical levels from *Lewandowski, 2007*

Guidance for the Producer



- Field Preparation
- Cultivar selection
- Planting rates, dates and methods
- Weed Control
- Fertilization
- Harvest Management

http://plant-materials.nrcs.usda.gov/pubs/NPMtechnotes/npmptn3-13079.pdf


Questions?