

# Establishing Switchgrass for Biomass Production

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## Biofeedstocks has potential to:

- Reduce greenhouse gas emissions, carbon neutral
- Reduce dependence on foreign oil
- Cleaner burning than coal
- Sequester carbon
- Increased wildlife benefits
- Increased water quality benefits
- Increase rural economy/reduce subdivision

## Why consider warm season grasses

- Spread out harvest schedule
- higher yielding than cool season grasses on shallow droughty soils
- Can harvest entire growing seasons growth with one cutting
- Provide wildlife habitat
- Switchgrass has good winter standability
- Cool season grass production slumps in midsummer
- 70% of WSG growth occurs in midsummer
- WSG tolerates drought conditions due to deeper rooting
- Tolerates low pH, N and phosphorus levels

## Site selection

- Previous crop – out of row crop or improved hay, may need a couple of years of preparation if in abandoned or old pasture
- Soils – moderately well drained or better, some ecotypes tolerate wetter conditions
- Slope – avoid steep slopes (erosion)
- Aspect – avoid North slopes at higher elevations

## Lime and Fertilizer

- Lime – optimum phosphorus availability between 6.0 – 7.0. Switchgrass tolerates pH of 5.5
- Fertilizer – P & K should be at the moderate levels. No Nitrogen fertilizer is recommended unless weeds are completely controlled. Apply in mid to Late July 40 lbs/ac.

## Seed quality

- 390,000 seeds/lb
- PLS – Pure live seed = % germination X %purity
- Dormancy – Need to avoid seed lots with high dormancy rate
- Weed seed – use certified seed to reduce weed seed
- Size and texture – Switchgrass flows through conventional seeding equipment easier than most other warm season grasses



Switchgrass seed



Six weeks after planting

## Seeding technique

- Machinery – Do not need native grass drill, can use conventional drill, Brillion, or broadcast
- Seeding date – Early corn planting time to June 15th. No dormant (fall) seeding
- Seed depth – ¼ - ½ inch
- Seed rate – 6 lb/ac pure live seed
- Spacing – 8 inch, broadcast/Brillion
- Nurse crop – No, or maybe 15 lbs/ac oats
- Legumes - No

## Weed control

- Follow cropland or use smother crops
- Roundup + 2,4-D or Banvel in fall before to help decompose sod if no-till seeding, should mow once summer before and then spray
  - Round up + 2,4-D or Banvel in fall or spring for conventionally tilled fields
  - Stale seed bed, prepare field early allow weeds to emerge spray with additional low rate(1 pint/ac) of roundup
- Following year spray Roundup in early spring when switchgrass is dormant to control CSG



End of first growing season



## Seedling Identification

### Weed control (Cont.)

- Mowing – if annual grass is a problem no registered herbicides available, mow 2X when weeds are overtopping switchgrass.
- Mowing early second year may be necessary.
- Burning – has been reported to be better at controlling woody vegetation, other benefits. Also liability and regs.

### Management

- Can Harvest once/year
- Harvest after regrowth potential is past or following springs standing biomass
- Need to determine best late season harvest date
- Fertilize with 50 – 100 lbs/ac of N or not
- depending on yield potential and weeds
- Weed control as needed
- Yields 3.5 – 5.0 tons/ac of Dry Matter



Switchgrass mid July



## Over-wintered switchgrass

### Other grasses under consideration

- Big Bluestem 3.5 – 5.7 t/ac
- Reed canarygrass 3.3 – 5.8 t/ac
- Tall fescue 3.8 – 6.3 t/ac
- Bromegrass - 6.7 t/ac
- Prairie cordgrass – 3.5 – 5.0 t/ac
- Miscanthus - ?
- Tall wheatgrass - ?

All can produce between 3 - 6 t/ac depending on management & soils, all can be improved for biomass, most breeding has been for forage quality

### Some Biofeedstock Statistics

- Corn grain 2.8 gallons/bu
- 100 bu/ac = 280 gallons/ac
- 150 bu/ac = 420 gallons ethanol
- Grass – 80 gallons/ton
- 3 ton/ac = 240 gallons/ac
- 5 ton/ac = 400 gallons/ac
- 100,000,000 gallon/year plant will require between 750 – 1250 acres/day