

Traits Associated with Invasiveness

Plant type	Bunch diameter (cm)
Average for cultivated types	59
Average for naturalized types	68
P value	< 0.001
% difference (cult. vs. naturalized)	-13%

Width of One Plant (Bunch)

Naturalized type



Cultivated type



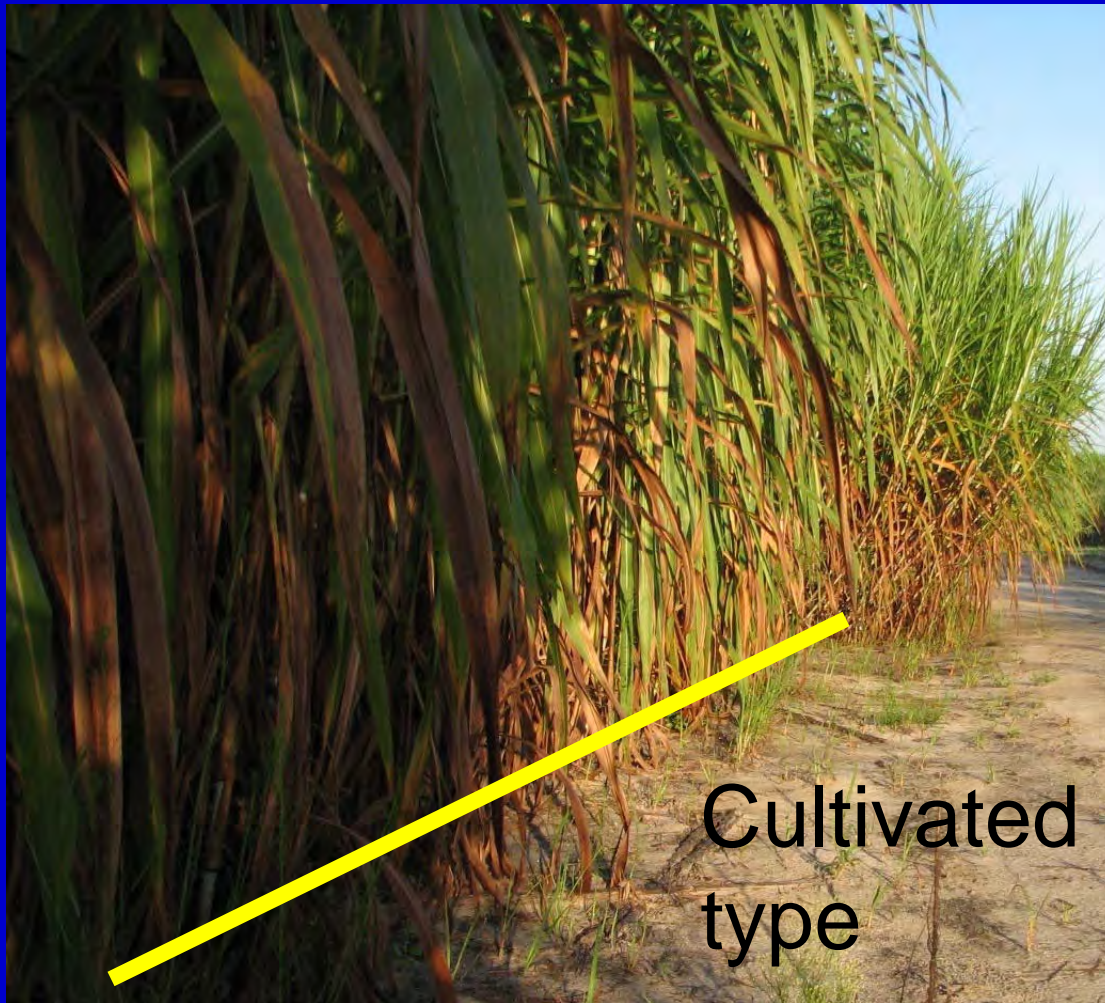
Traits Associated with Invasiveness

Plant type	Bunch diameter (cm)	Growth habit ranking (1-10; 1 = erect)
Average for cultivated types	59	3.3
Average for naturalized types	68	5.3
P value	< 0.001	< 0.001
% difference (cult. vs. naturalized)	-13%	-38%

Growth Habit (18 months after planting)



Growth Habit



Naturalized
type

Cultivated
type

Potential to Spread from Nodes

Naturalized type



Traits Associated with Invasiveness

Plant type	Bunch diameter (cm)	Growth habit ranking (1-10; 1 = erect)	First flower (days after 15 October)
Average for cultivated types	59	3.3	26
Average for naturalized types	68	5.3	10
P value	< 0.001	< 0.001	< 0.001
% difference (cult. vs. naturalized)	-13%	-38%	+ 16 days

Traits Associated with Growth Potential

Plant type	Height (m)	Leaf length (cm)	Leaf width (mm)	Stem diameter (mm)
Average for cultivated	3.8	105	37	17
Average for naturalized	3.4	71	23	14
P value	<0.001	<0.001	<0.001	<0.001
% difference (cultivated vs. naturalized)	+13%	+48%	+61%	+21%

Biomass Accumulation Traits

Plant type	Tillers/ plant	Mass/ tiller (g)	Mass/ plant (kg)
Average for cultivated types	32	275	8.8
Average for naturalized types	37	160	5.9
P value	< 0.001	< 0.001	< 0.001
% difference (cultivated vs. naturalized)	-14%	+72%	+49%

Late Flowering Types

- Two of the cultivated types flowered particularly late.
- Desirable characteristic for both biomass accumulation and minimizing risk of spread by seed

Late Flowering (LF) Types

Plant type	Height (m)
Average for late flowering types	4.1 (3.8)
Average for naturalized	3.4
P value	< 0.001
% difference (LF vs. naturalized)	+21% (+13)

Average of all cultivated types in parentheses

Late Flowering (LF) Types

Plant type	Height (m)	Leaf length (cm)	Leaf width (mm)	Mass/ tiller (g)	1st flower (days after 15 October)
Average for late flowering types	4.1 (3.8)	116 (105)	45 (37)	328 (275)	50 (26)
Average for naturalized	3.4	71	23	160	10
P value	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
% difference (LF vs. naturalized)	+21% (+13)	+63% (+48)	+96% (+61)	+105% (+72)	+40 d (+16)

Summary – Morphology/Flowering

- Cultivated types:
 - Are taller, more upright growing, with longer leaves
 - Have fewer but larger stems
 - Are less likely to spread from the bunch or to fall over and root
 - Flower later, allowing for a longer vegetative growth period and reduced likelihood of spread by seed

Summary – Genetic Analysis

- Genetic analysis indicates significant differences among elephantgrasses.
- Cultivated types are genetically more similar to each other than to weed types.

Conclusions

- Genetic, morphological, and flowering data show large differences among types classified as *Pennisetum purpureum*.
- Differences indicate that some elephantgrasses have a greater propensity for invasiveness.
- Decisions on whether elephantgrass should be used as a bioenergy crop should take into account these within-species differences.