



### Biological characteristics of Juncao grass species and planting technique

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3<sup>th</sup> Nov, 2021





### **¤** Grass species & characteristics

## **Contents** ¤ Scientific researches

### **¤ Biosafety Assessment**







### 1. Pennisetum purpureum Schumach.













- Root: fibrous roots and well-developed roots; the deepest reaches is 4m.
- Stem: height 3-4m, stem erect, coarse hard, caespitose, round, diameter 1-3cm; tillering is up to 50-100.













### March









May









August

















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### **Biological characteristics**



- It is a tall, erect, bushy perennial plant, which has strongly developed root system. The steam can be up to 7.08 m, but is normally 4-5 m in height and the diameter of stem is usually 1.5-2.5cm.
- Typical four carbon plants with high photosynthesis efficiency



#### 1681 g in weight for a single clump



#### The diameter of stem is 3.15 cm

#### The average height is 4.43 m





### Well-developed root system

In Ulanbuhe desert, Giant Juncao grew for 115 days, with plant height of 2.5 m and 68 tillers. Aboveground and underground fresh weight were 12.71kg and 11.04kg. The root penetration depth was 1.2 m.













#### Juncao technology model

#### Traditional agricultural model



![](_page_17_Picture_0.jpeg)

### Tall plant with large biomass

1000

![](_page_17_Picture_2.jpeg)

![](_page_17_Picture_3.jpeg)

![](_page_18_Picture_0.jpeg)

![](_page_18_Picture_1.jpeg)

#### The crude protein content of Giant Juncao is 8-17%

![](_page_18_Picture_3.jpeg)

![](_page_19_Picture_0.jpeg)

![](_page_19_Picture_1.jpeg)

![](_page_19_Picture_2.jpeg)

### Drought, watering, storm, saline-alkali resistance

![](_page_19_Picture_4.jpeg)

![](_page_20_Picture_0.jpeg)

### **Scientific researches**

![](_page_20_Picture_2.jpeg)

![](_page_20_Figure_3.jpeg)

Effect of drought stress and rehydration condition on the growth of Giant Juncao. A picture of Giant Juncao under different treatments condition.

![](_page_20_Picture_5.jpeg)

![](_page_21_Picture_0.jpeg)

		Module-trait relationships							
MEsalmon4	-0.057 (0.8)	-0.036 (0.9)	0.061 (0.8)	0.00094 (1)	0.051 (0.8)	-0.024 (0.9)	-0.15 (0.6)	0.00055 (1)	
MElightgreen	0.22 (0.4)	0.22 (0.4)	0.095 (0.7)	0.27 (0.3)	0.054 (0.8)	-0.018 (0.9)	-0.2 (0.4)	-0.1 (0.7)	1
Emediumpurple3	-0.27 (0.3)	-0.22 (0.4)	-0.18 (0.5)	-0.27 (0.3)	-0.034 (0.9)	-0.23 (0.3)	-0.19 (0.5)	-0.084 (0.7)	
MEnavajowhite2	0.078 (0.8)	0.15 (0.6)	0.25 (0.3)	-0.32 (0.2)	-0.41 (0.09)	-0.38 (0.1)	-0.2 (0.4)	-0.37 (0.1)	
MEturquoise	-0.73 (6e-04)	-0.71 (9e-04)	-0.49 (0.04)	-0.67 (0.002)	0.0044 (1)	-0.11 (0.7)	0.19 (0.5)	0.23 (0.4)	
MEwhite	-0.54 (0.02)	-0.7 (0.001)	-0.61 (0.008)	-0.11 (0.7)	0.39 (0.1)	0.6 (0.009)	0.75 (3e-04)	0.78 (1e-04)	-0.5
MEhoneydew1	0.13 (0.6)	0.14 (0.6)	0.13 (0.6)	0.067 (0.8)	-0.093 (0.7)	-0.097 (0.7)	-0.23 (0.4)	-0.11 (0.7)	
MEbrown4	0.17 (0.5)	0.32 (0.2)	0.2 (0.4)	-0.0032 (1)	-0.25 (0.3)	-0.32 (0.2)	-0.41 (0.09)	-0.28 (0.3)	
MEorangered4	-0.34 (0.2)	-0.2 (0.4)	-0.12 (0.6)	-0.47 (0.05)	-0.21 (0.4)	-0.38 (0.1)	-0.26 (0.3)	-0.15 (0.6)	
MEdarkgrey	0.6 (0.008)	0.49 (0.04)	0.42 (0.08)	0.6 (0.008)	0.1 (0.7)	0.34 (0.2)	0.2 (0.4)	-0.025 (0.9)	
MEmagenta	0.31 (0.2)	0.48 (0.04)	0.14 (0.6)	0.053 (0.8)	-0.48 (0.04)	-0.17 (0.5)	-0.25 (0.3)	-0.047 (0.9)	
MEsaddlebrown	0.72 (8e-04)	0.8 (6e-05)	0.71 (0.001)	0.26 (0.3)	-0.4 (0.1)	-0.46 (0.06)	-0.6 (0.009)	-0.74 (4e-04)	
MEbrown	0.73 (6e-04)	0.77 (2e-04)	0.73 (6e-04)	0.26 (0.3)	-0.4 (0.1)	-0.3 (0.2)	-0.36 (0.1)	-0.62 (0.006)	
MEdarkorange2	0.82 (4e-05)	0.87 (2e-06)	0.86 (4e-06)	0.35 (0.2)	-0.33 (0.2)	-0.39 (0.1)	-0.52 (0.03)	-0.8 (6e-05)	
MEmaroon	0.03 (0.9)	-0.094 (0.7)	-0.038 (0.9)	0.22 (0.4)	0.58 (0.01)	0.62 (0.006)	0.62 (0.007)	0.22 (0.4)	0.5
MEskyblue	0.17 (0.5)	-0.1 (0.7)	-0.098 (0.7)	0.69 (0.001)	0.67 (0.003)	0.87 (3e-06)	0.72 (8e-04)	0.57 (0.01)	
MEdarkred	-0.5 (0.03)	-0.26 (0.3)	-0.6 (0.009)	-0.5 (0.03)	-0.39 (0.1)	-0.14 (0.6)	-0.039 (0.9)	0.48 (0.05)	
MEblack	-0.17 (0.5)	-0.14 (0.6)	-0.45 (0.06)	0.1 (0.7)	0.002 (1)	0.36 (0.1)	0.26 (0.3)	0.64 (0.004)	
MEfloralwhite	-0.089 (0.7)	0.041 (0.9)	-0.33 (0.2)	-0.0059 (1)	-0.24 (0.3)	-0.016 (1)	-0.14 (0.6)	0.32 (0.2)	-1
MEgrey	-0.084 (0.7)	-0.082 (0.7)	-0.057 (0.8)	-0.032 (0.9)	0.019 (0.9)	0.088 (0.7)	0.062 (0.8)	0.2 (0.4)	
_	<i>4</i> <sup>(</sup>	~	୍ତ	WHE	40D	40D	2RD	MDA	-

![](_page_21_Picture_2.jpeg)

![](_page_22_Picture_0.jpeg)

![](_page_22_Figure_1.jpeg)

B

Transcription factor family of root and leaf differential expression genes in Giant Juncao.(Zhou et al., Acta Prataculturae *Sinica*, 2021)

![](_page_23_Picture_0.jpeg)

![](_page_23_Picture_1.jpeg)

### Rich in endophytic nitrogen-fixing bacteria

![](_page_23_Figure_3.jpeg)

Comparison of endophytic bacteria groups

The morphology of the identified strains in culture medium and under microscope

![](_page_24_Picture_0.jpeg)

### Biosafety Assessment of Introduced Giant Juncao

![](_page_24_Picture_2.jpeg)

#### **Criteria for Risk Grading of Giant Juncao**

	Risk Grade	Risk Level	Comprehensive Assessment Value	Significance of Invasion Biology	Management Strategy	
	I	Severe	2.50-3.00	The risk of invasion is severe, and the hazard are first- class pests or malignant weeds	Introduction prohibited	
	II	High 2.00-2.50		The risk of invasion is high, and the hazard are second- class pests or regional malignant weeds	Introduction prohibited	
	III	III Moderate 1.50-2.0		The risk of invasion is moderate, and the hazard are third-class pests or common weeds	Introduction prohibited	
9	IV	IV Low 1.00-1.50		The risk of invasion is low	Introduction allowed, but with control measures	
「たいいちとう」い	V	Negligible	0.00-1.00	The risk of invasion is negligible	Introduction allowed with no need of any measures	

![](_page_25_Picture_0.jpeg)

![](_page_25_Picture_1.jpeg)

#### •The productive mode is mainly asexual reproduction.

#### •Usually no seeds are produced, but when seeds

#### are produced, they are mostly abortive.

![](_page_26_Picture_0.jpeg)

![](_page_26_Picture_1.jpeg)

# Thank you