

# Sorghum Meeting Lipnik 6<sup>th</sup> of October 2017

Sorghum



# The development of sorghum varieties for human consumption, for feed and for energy production

- Sorghum: origin and botany
- **The importance of sorghum worldwide**
- **Sorghum in EU**
- **The special characteristics of sorghum**
- **Uses of sorghum**
- **Requirements for a successful cultivation of sorghum in Poland**
- Sources of information



## The large genetic diversity of sorghum

- 500 species in the *poaceae* family

Pennisetum, Setaria, Eragrostis, Eleusine, and Panicum millet, including millet weeds: **Johnsongrass** (*Sorghum halepense*)

**origins:** Africa, China, the Orient, India, Mediterranean countries

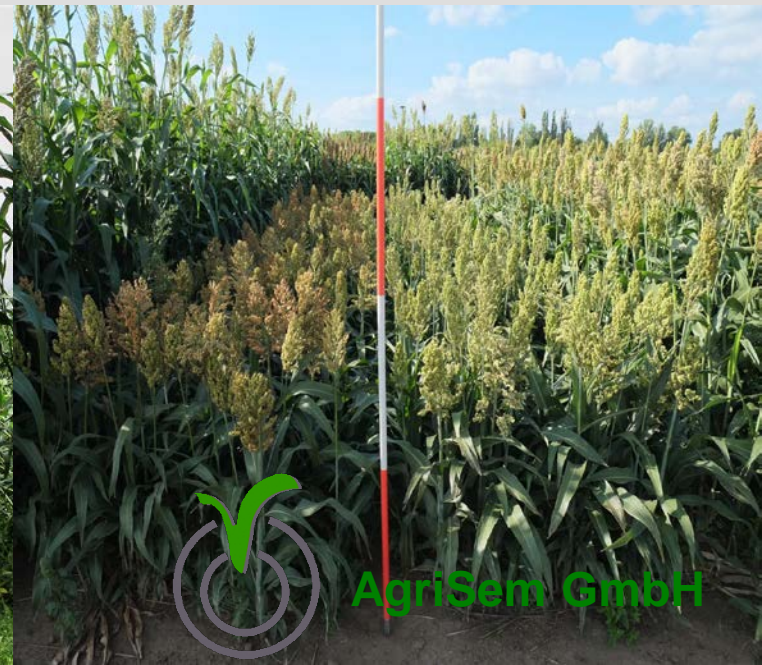
sorghum sudanense



vegetative s. bicolor

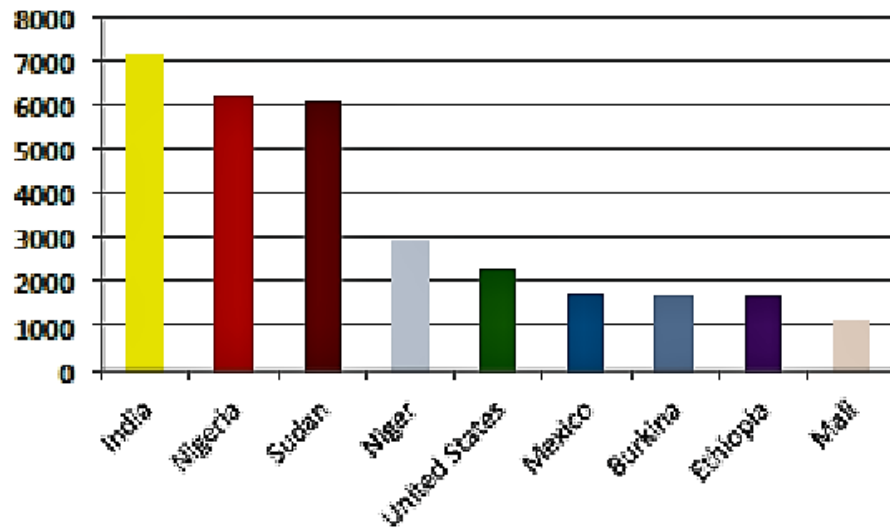


grain sorghum bicolor

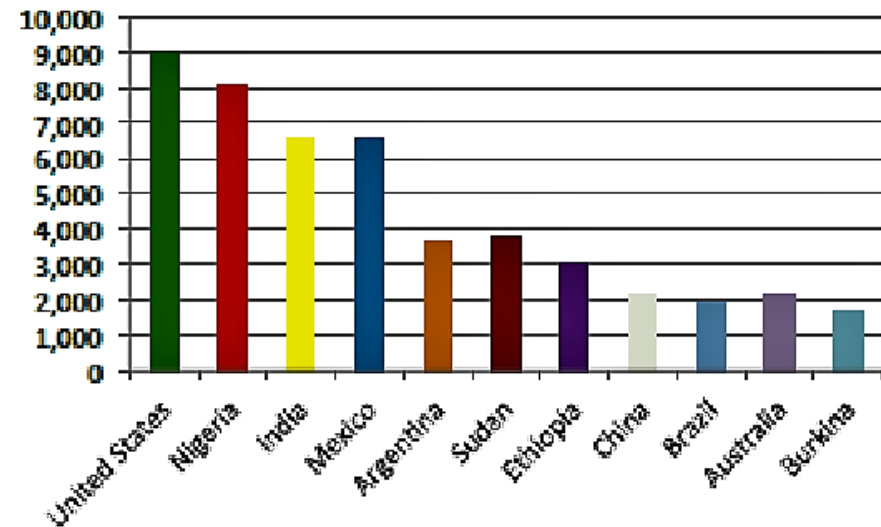


# The importance of sorghum worldwide area and production

## Harvested Area (1000 HA)

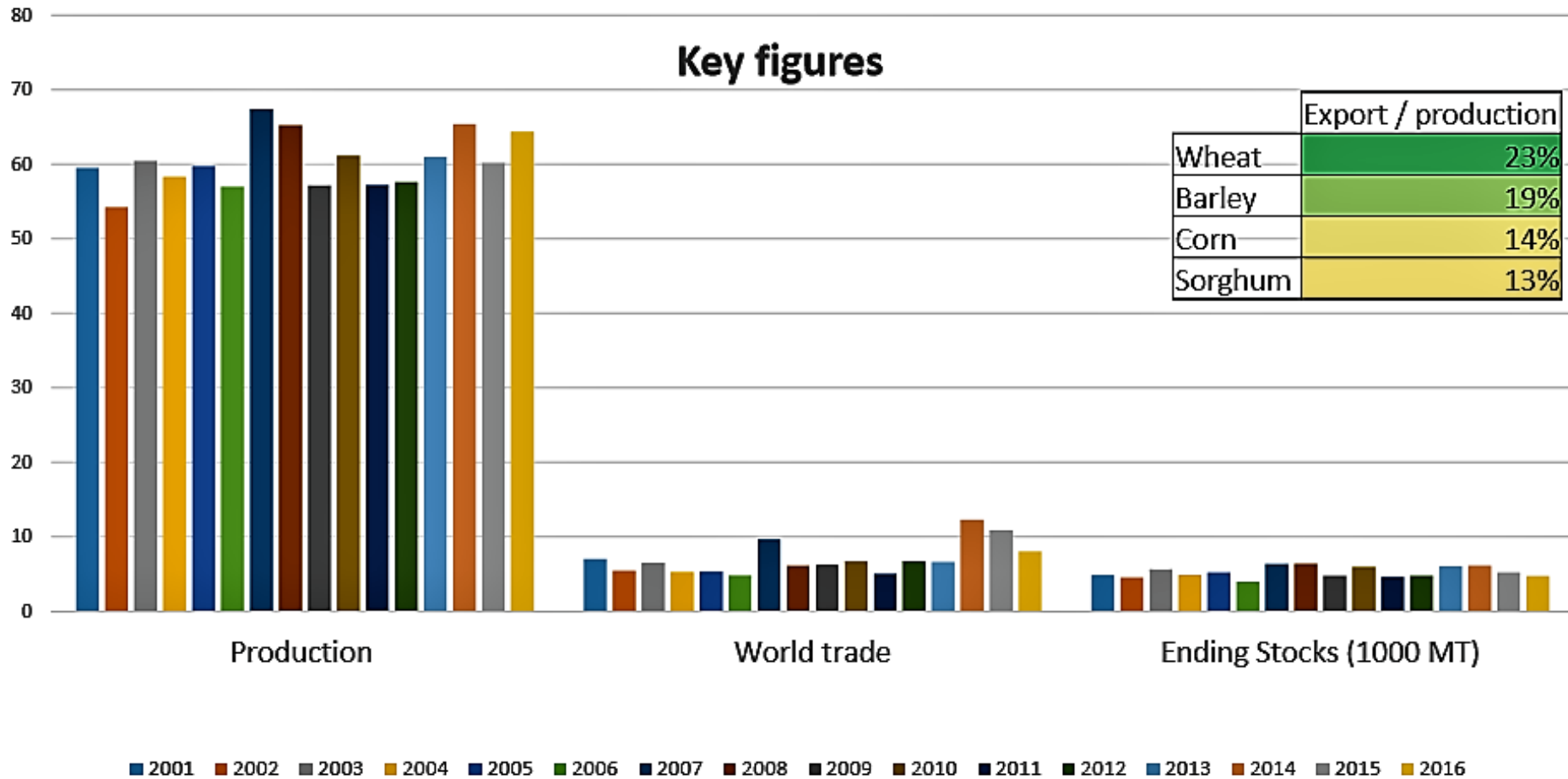


## Production (1000MT)



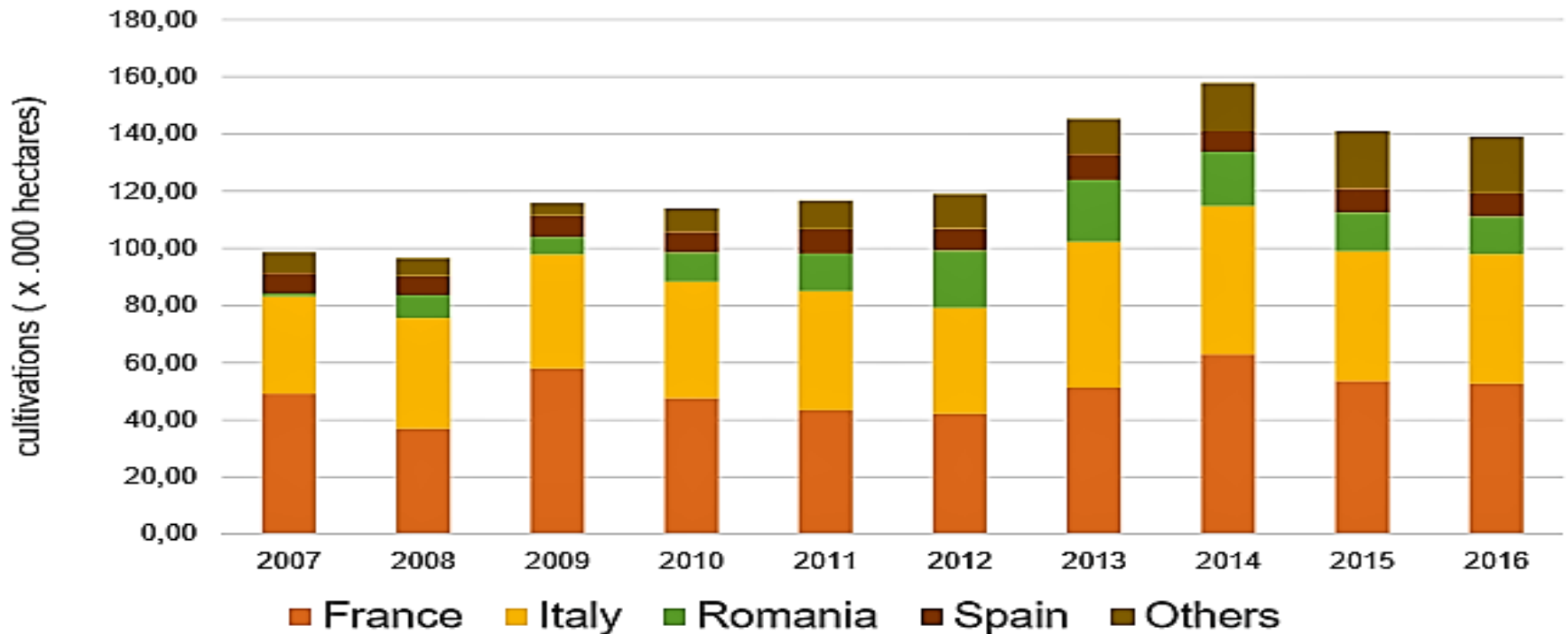
# The importance of sorghum worldwide production and trade

## Key figures



# The importance of sorghum in EU production and years

## Main EU countries in cultivation since 2007



Germany 8.000 – 10.000 ha

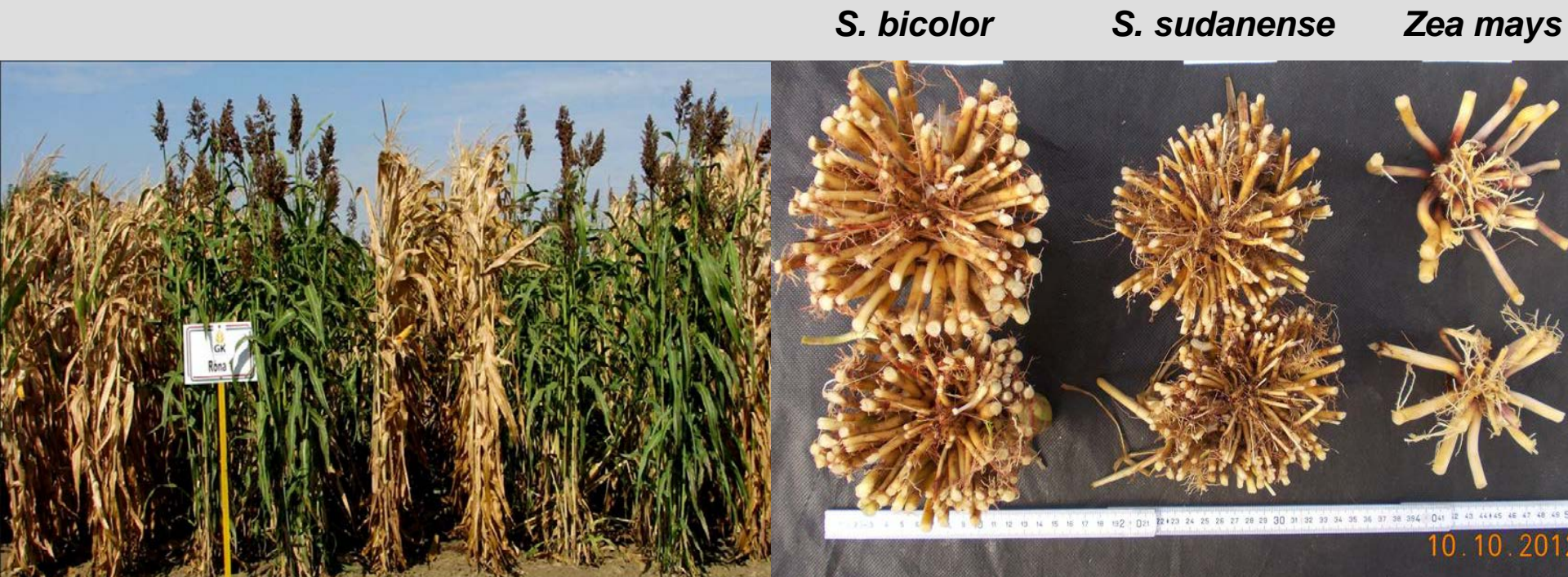
Source: EUROSTAT - National data



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## The special characteristics of sorghum

- drought stress tolerance due to an intensive, fine root system



## The special characteristics of sorghum

- positive crop rotation effect



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## The special characteristics of sorghum

- Slight damage caused by pathogens



## The special characteristics of sorghum

- **Correct sowing is a condition for optimal growth**



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## The special characteristics of sorghum

- A regulation of the weeds is urgently necessary
- Herbicide damage must be avoided



## The special characteristics of sorghum

- the choice of row spacing and plant density is an important agronomic decision



## The special characteristics of sorghum



### Properties of biomass Sorghum varieties:

**High potential for biomass  
> 20 tm / ha**

**Low TS content at harvest time  
Approx. 18 - 22% = high losses**

**Storage of lignin in the stems**

**Risk of lodging**

**Low fodder quality and low methane  
yield  
Approx. 250 ln / Kg TM**



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## The special characteristics of sorghum



**Properties of granulated concrete  
Sorghum varieties:**

**Comparable potential for biomass  
With increased plant density (35 / m<sup>2</sup>)  
Approx. 20 tm / ha**

**Optimal TS content for harvesting  
Approx. 32 - 38% = low losses**

**Storage of starch in the grains**

**High standability**

**Very high feed value and methan yield  
About 320 ln / Kg TM**



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# The importance of sorghum in EU

The breeding goals of AgriSem partners:

high grain yield and early maturity, high feed value, compact and stable



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# The special characteristics of sorghum

## Nährstoffgehalte von Körnerhirse

### im Vergleich zu anderen Getreidearten in g/kg Trockenmasse

Quelle: N. LÜTKE ENTRUP u.a. 2000; Blgg 2009

Getreide	Rohprotein g/kg TM	Rohfett g/kg TM	Rohfaser g/kg TM	NfE g/kg TM	Stärke g/kg TM
Weizen	138	20	29	794	675
Gerste	125	27	57	764	600
Mais	106	46	26	805	695
Roggen	113	18	28	819	646
Hafer	123	52	113	679	447
<b>Körnerhirse</b>	<b>128</b>	<b>33</b>	<b>27</b>	<b>790</b>	<b>659</b>



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## The special characteristics of sorghum

- The harvest of sorghum, can be done with forage harvesters
- The harvested crop is very homogeneous and can be preserved well



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## The special characteristics of sorghum

### Inhaltsstoffe und Methanpotenziale von Sorghum

Proben aus Praxisschlägen 2012

		GK-Emese	Sweet Susana	Silomais *
TS%		31,4	37,3	32 - 38
Rohasche	g/kg TM	45	38	35 - 45
Rohprotein	g/kg TM	95	93	70 - 90
Rohfaser	g/kg TM	193	174	170 - 190
Stärke	g/kg TM	345,4	360,0	> 300
ELOS	%			69 - 78
FoTS	g/kg TM	810	833	
Methangehalt	%	55	55	55,1 **
Methan	IN/kg TSK	<b>340</b>	<b>350</b>	<b>306,9 **</b>

\* Richtwerte des Blgg

\*\* KTBL 2009

Quelle: Blgg 2012; KTBL 2009



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## The special characteristics of sorghum

Seed production under favorable climatic conditions in South Hungary

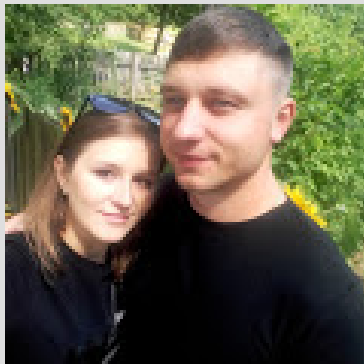


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# The importance of sorghum in EU

## Requirements for a successful cultivation of sorghum in Poland

- Development of varieties with good cold tolerance
- Construction of a suitable test system
- Organization of cultivation trials in different locations
- Expanding of experiences in cultivation and varieties information in practical farming
- **Agricultural think**<http://agriculturalthink.blogspot.com>



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# The importance of sorghum in EU

- **AgriSem activities in Poland**
- on the trial field of the University of Szczecin in Lipnik



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Energia z potęgą słońca

### **GK EMESE** Odmiana UE FAO około 210

- Sorgo ziarnowe odporne na wyleganie
- Odmiana wczesna o dobrej stabilności plonowania
- Wysoka wartość paszowa ziarna jak i całej rośliny
- Omlot wiewch przebiega bezproblemowo gwarantując uzyskanie dużej ilości ziarna z wiewch (8-9 t z 1 ha)

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Agrisem jest partnerem biznesowym firmy Top 1



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# The importance of sorghum in EU

- **AgriSem activities in Poland**



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# First results 2017

## performance test 2017

location: Grünseiboldsdorf, Bayern

### Grain Sorghum

Variety	DM dt/ha	TS %	Lodging	plant height, cm
GK Erik	250	25,1	1	300
GK Balacs	211,25	28,2	7	290
ASM 4-11	189,18	25,4	2	193
ASM 21-09	184,37	25	2	213
Farmsugro 18	146,59	27,5	1	170
GK Emese	118,63	29,7	1	143
Average	183,34	26,8	2	218

### Silage Sorghum

Variety	DM dt/ha	TS %
Herkules	273,67	30,9
Gardavan	170,16	31,3
Average	221,92	31,10

### silage maize

Variety	DM dt/ha	TS %	starch
Neutrino	271,82	33,2	27,3
ES Metronom	204,36	32,5	28,8
Average	236,39	31,8	27,1



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# First results 2017

## Biogashirse Sortenversuch 2017



Niederschlag:  
3 Gardo Gold

Quelle	Mai	Juni	Juli	Aug.	Summe
HV mm	44	47	69	59	172

Sorte	Firma	Frischmasse t/ha	Trockensubstanz %	Trockenmasse t/ha	Rohprotein g/kg TS	NFE g/kg TS	Rohfaser g/kg TS	Ertrag relativ % zum Versuchsmittel
Biomass 133	SB	50,4	29,4	14,8	70	548	320	110
ES Harmattan	DSAAT	33,6	31,0	10,4	77	552	286	77
KWS Sole	KWS	27,0	44,4	12,0	64	537	328	89
KWS Tarzan	KWS	42,9	35,2	15,1	63	547	329	112
PR823F	PIO	50,4	29,4	14,8	70	548	320	110
Puffalo*	ASEM	43,6	24,3	10,6	85	552	286	79
RGT Guepard	RAGT	52,1	29,0	15,1	68	529	344	112
RGT Joggy	RAGT	51,4	28,6	14,7	74	496	365	109
Styx	DSAAT	41,3	35,8	14,8	62	551	322	110
Sweet Caroline*	ASEM	45,1	32,2	14,5	81	613	235	108
Sweet Susana*	ASEM	32,0	35,8	11,5	75	593	259	85
Ø Versuch		42,7	32,3	13,5	72	551	309	100



A group of men in suits are standing in a field of green sorghum plants. The plants are tall and have large, dense, green panicles. The men are looking at the plants and talking to each other. The background is a vast field of similar plants under a bright sky.

**Thank you for listening!**  
and visit our website:  
[www.energiepflanzen.net](http://www.energiepflanzen.net)



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