

Energy Sorghum

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Sorghum breeding



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Energy Sorghum project



2004
Novelle of EEG

2005
FNR-Project
Energy sorghum
•Uni Hohenheim
•BLL Freising

2007
First Prototypes

today
Breeding development
Target:
Higher cold tolerance and lower
Lignin content



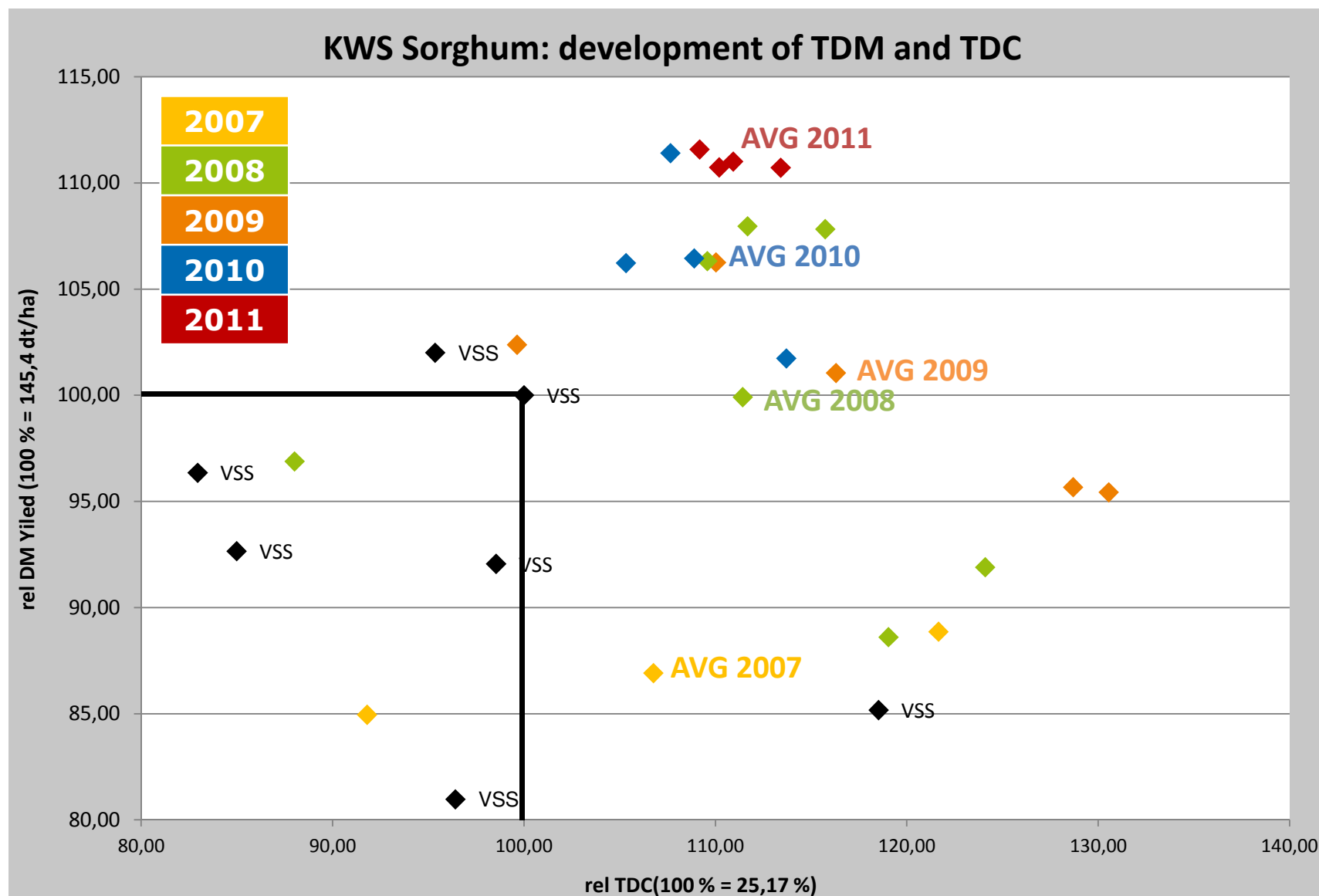
Main Breeding Targets Energy Sorghum

- ▶ **Potential Yield at the stage of Energy Corn, also on sandy soils**
- ▶ **High biomass yield**
 - ▶ high dry matter yield: 25 - 30 t/ha by 600 mm p.a.
 - ▶ Dry matter content at harvest by 28%
- ▶ **Stability**
- ▶ **Fast young development**
 - ▶ Increase of cold tolerance
 - ▶ Fast and homogenous germination power
- ▶ **Disease resistance**



Breeding in KWS started in 2007

Development of TDM and TDC



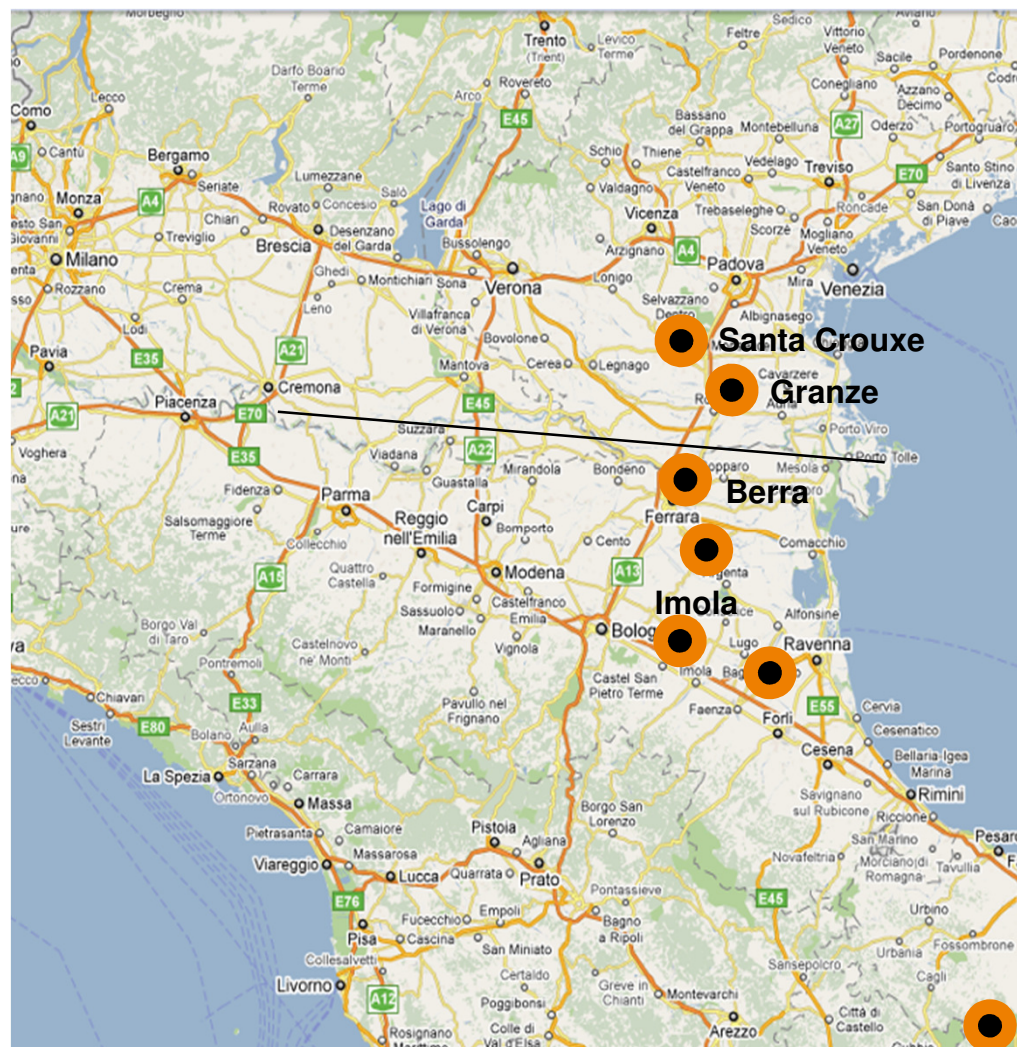
Testing system of KWS



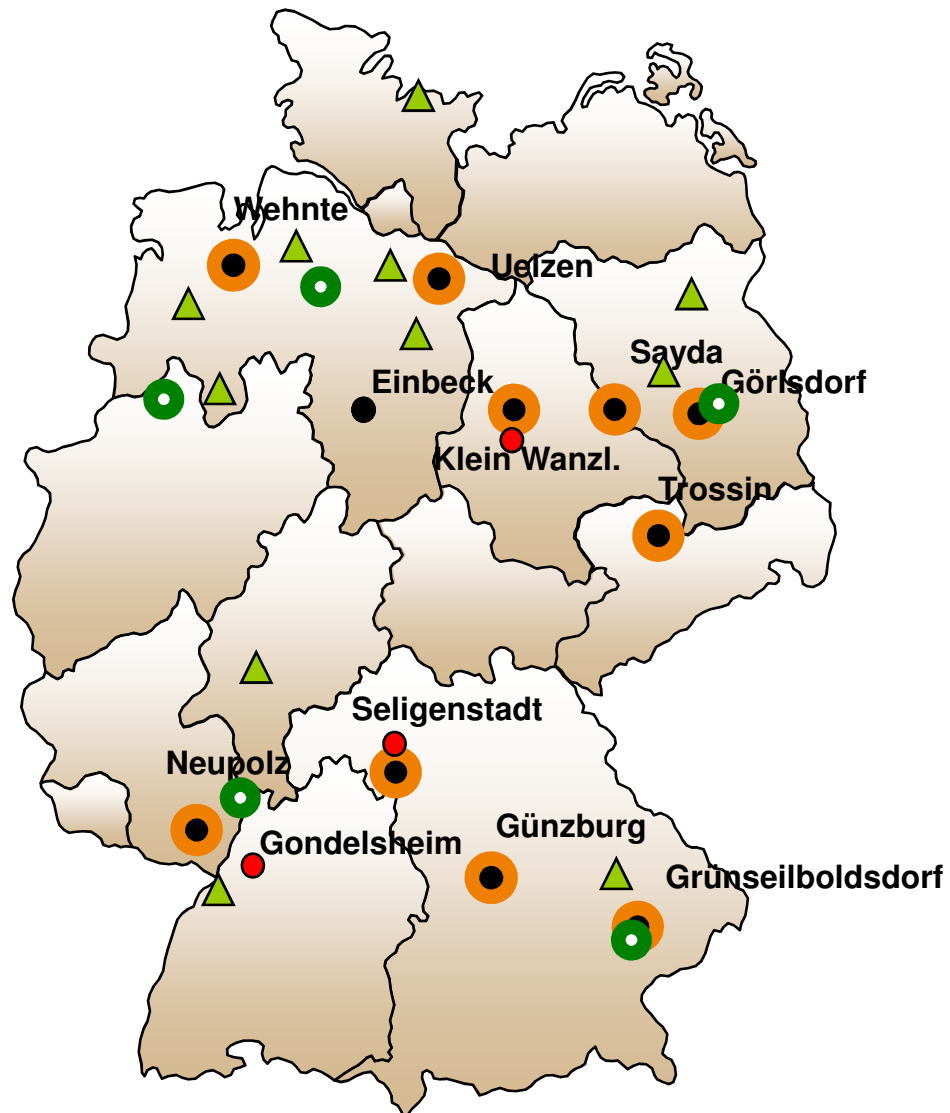
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Italian Yield plots and observation in 2014

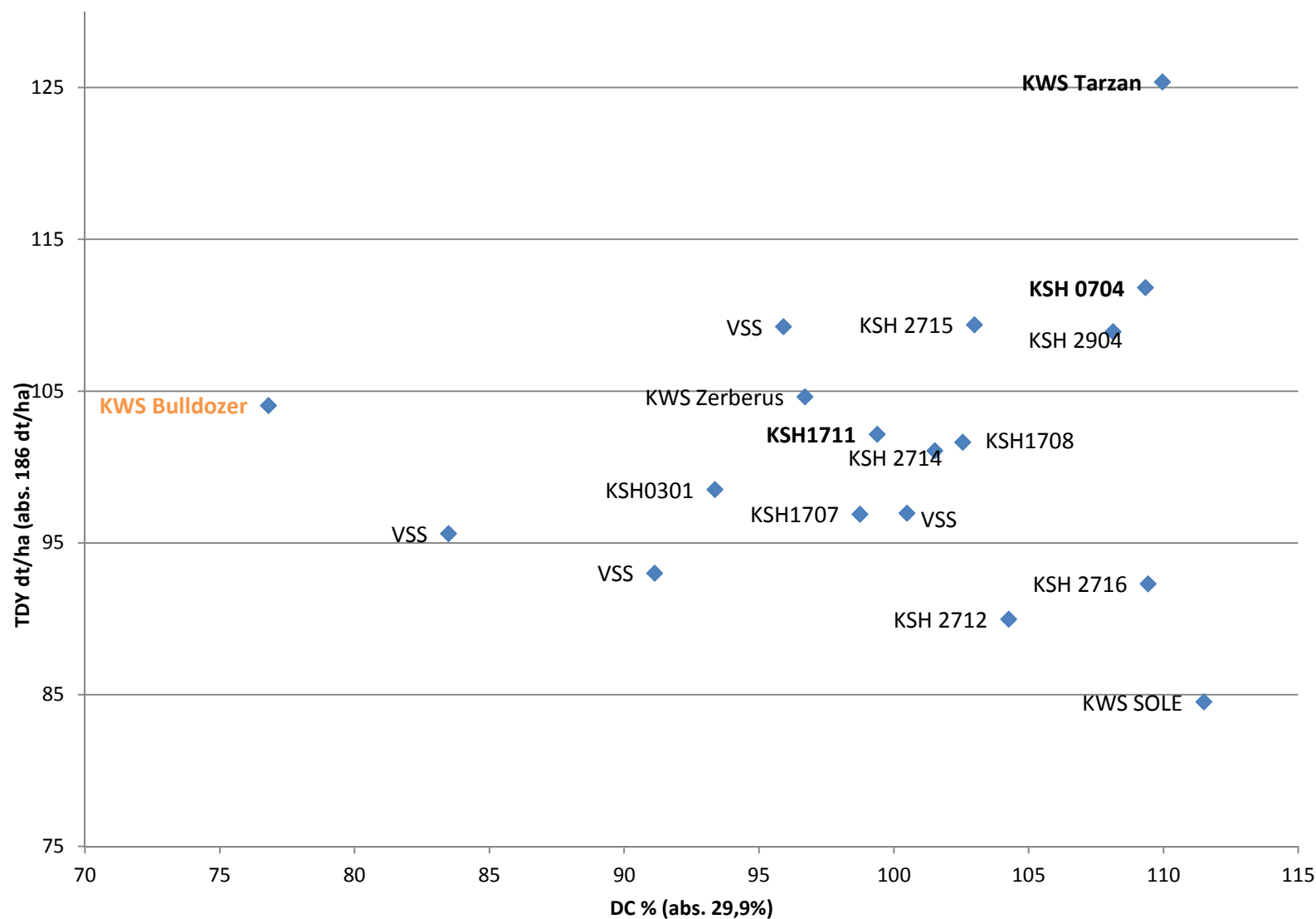


Locations in Germany 2014

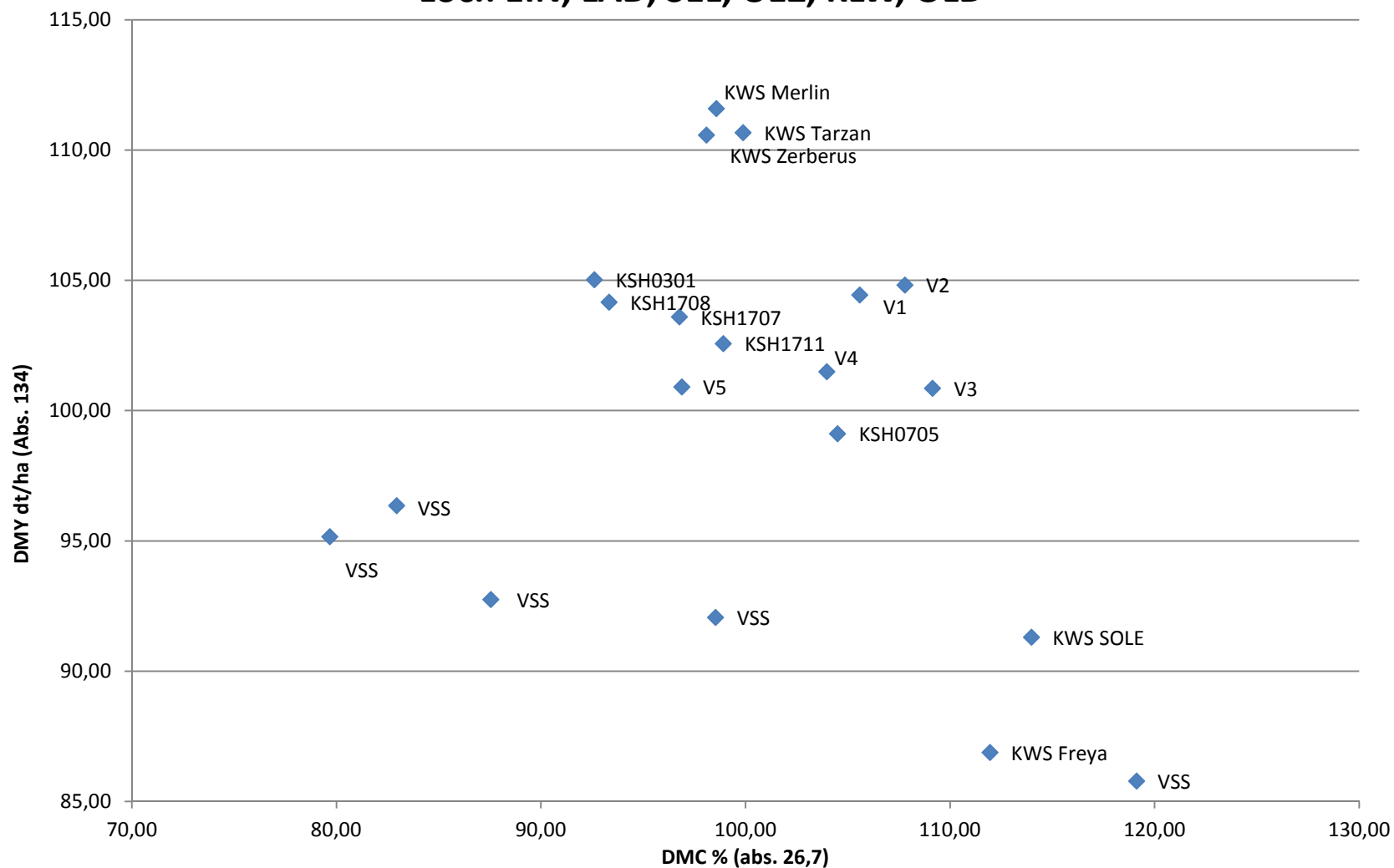


- KWS Yield trials
- KWS Agroservice
- Official trials (Agricultural Chambers, Universities..)
- Pro-Corn trials

Italy (rel.)



Maincrop 2013 Loc.: EIN, LAD, SEL, UEZ, K LW, OLD

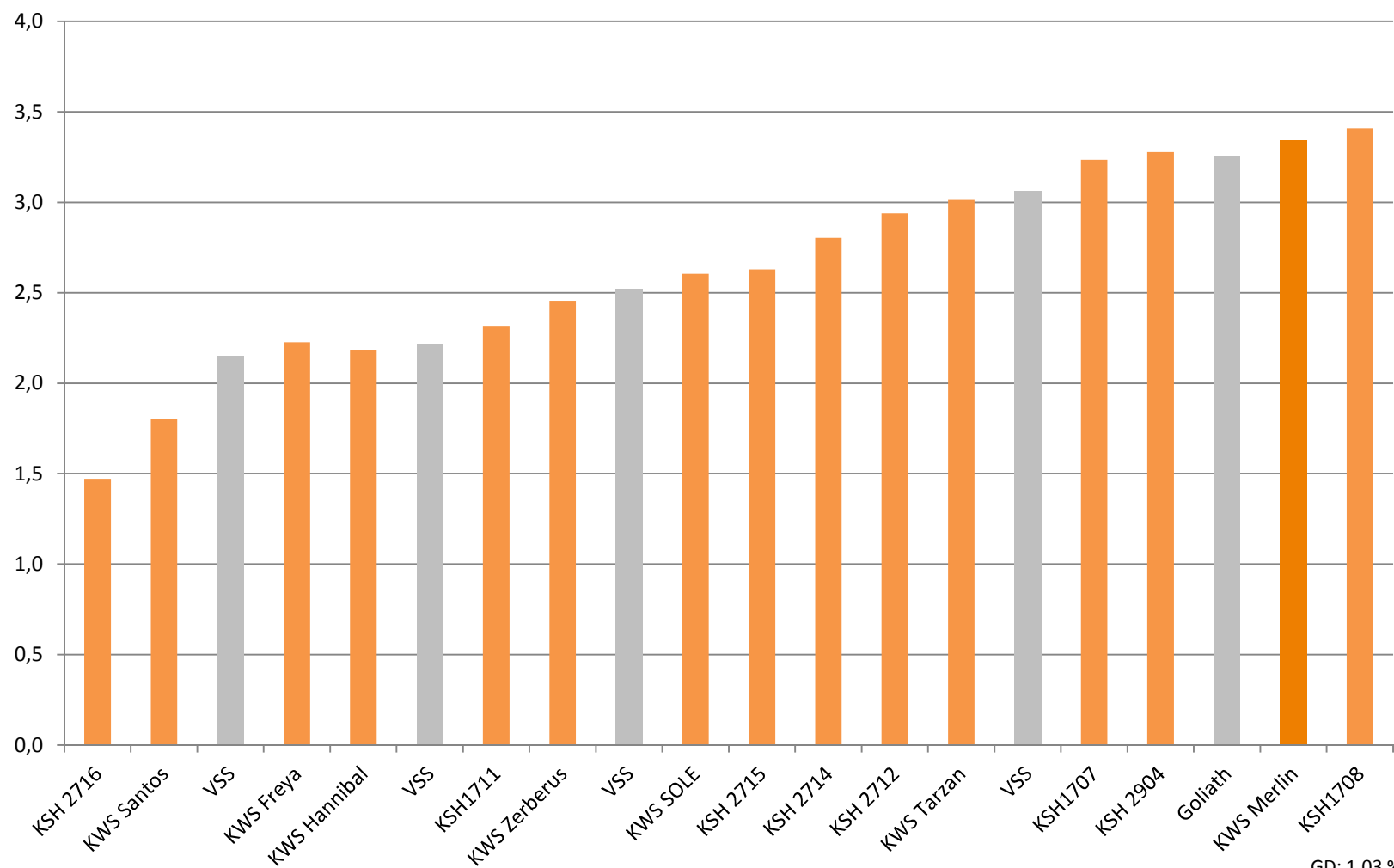


Lodging tolerance 2013



Lodging tolerance

Einbeck, Grünseiboldsdorf, Günzburg, Uelzen, Klein Wanzleben, Seligenstadt, Ladenburg, Wehnen



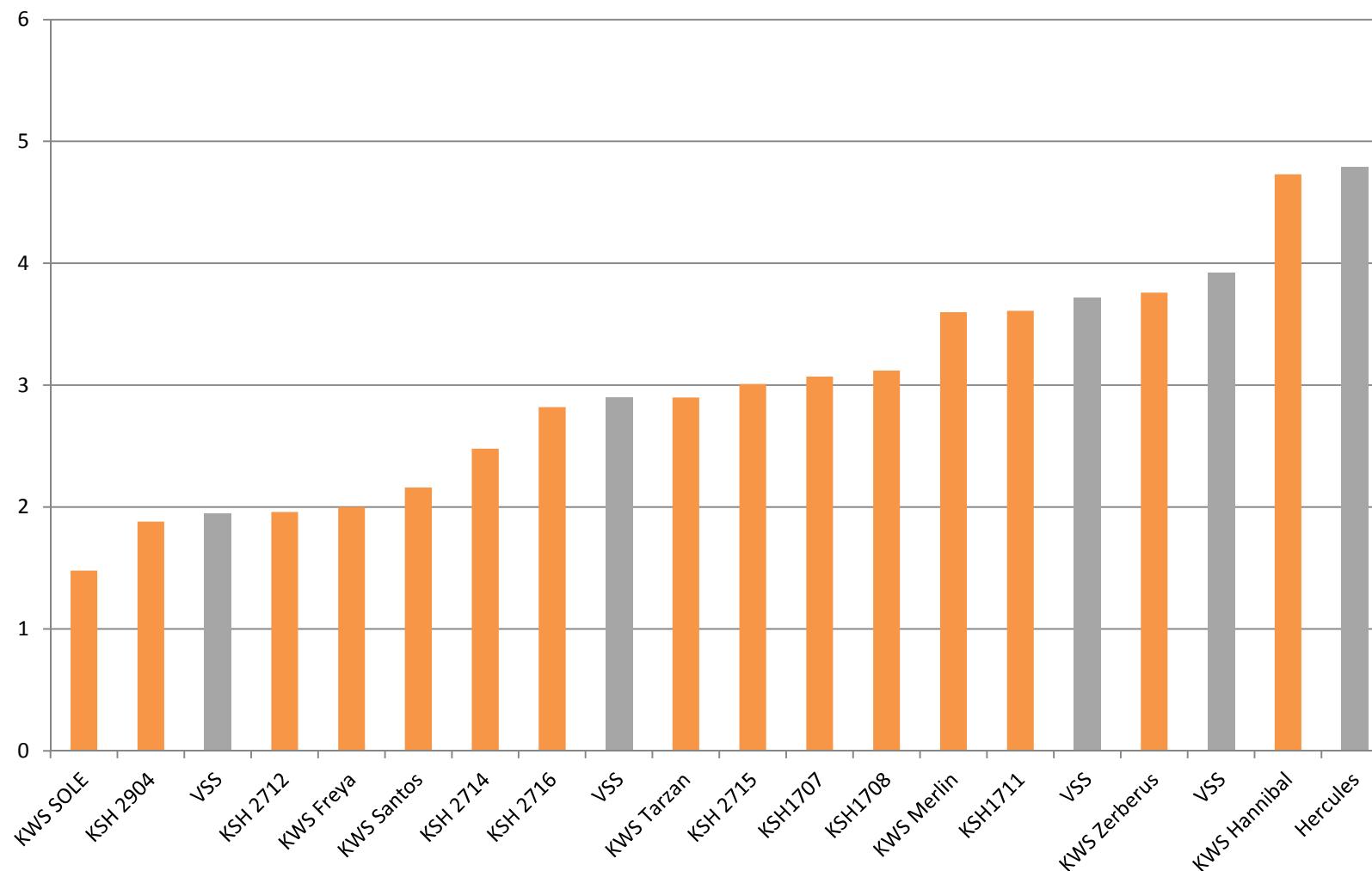
GD: 1,03 %

Early Vigor 2013



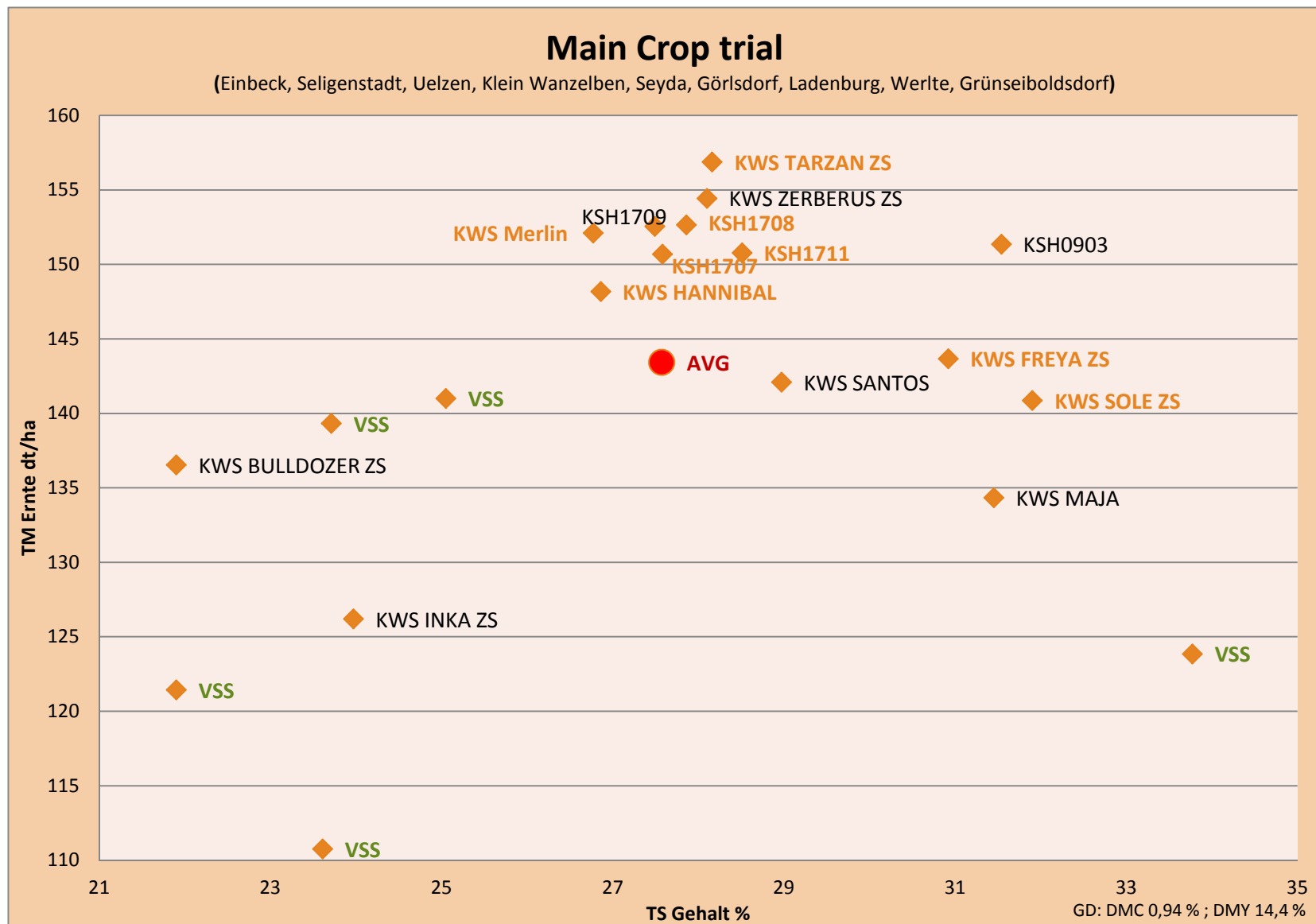
Early vigor 2013

Einbeck, Grünseiboldsdorf, Günzburg, Uelzen, Klein Wanzleben, Seligenstadt, Ladenburg, Wehnen



GD: 0,71 %

Yield trial 2012

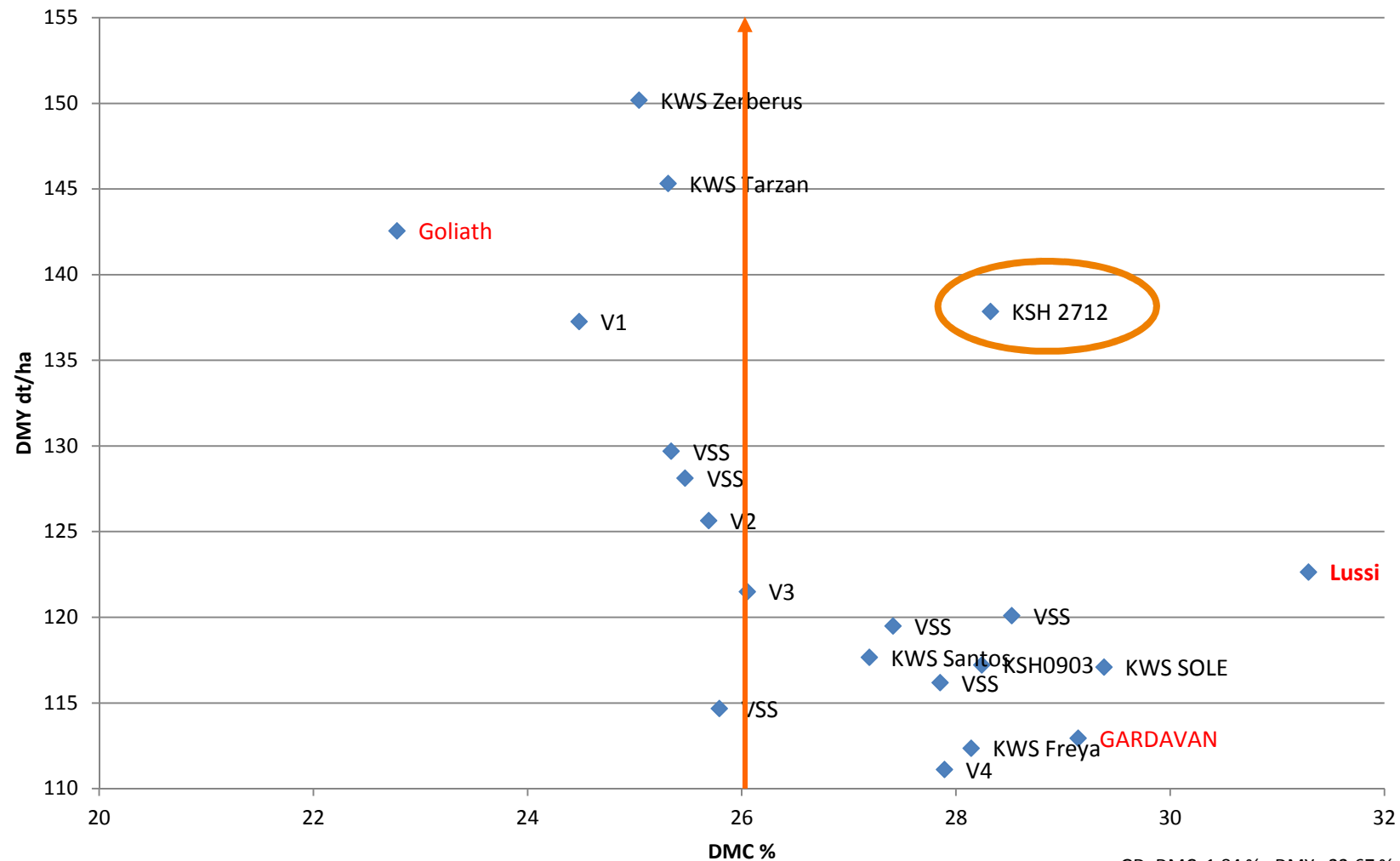


Second crop 2013



Second crop 2013

Seligenstadt, Klein Wanzleben, Grünseiboldsdorf



GD: DMC 1,84 % ; DMY 22,67 %

Five important steps for successful sorghum growing



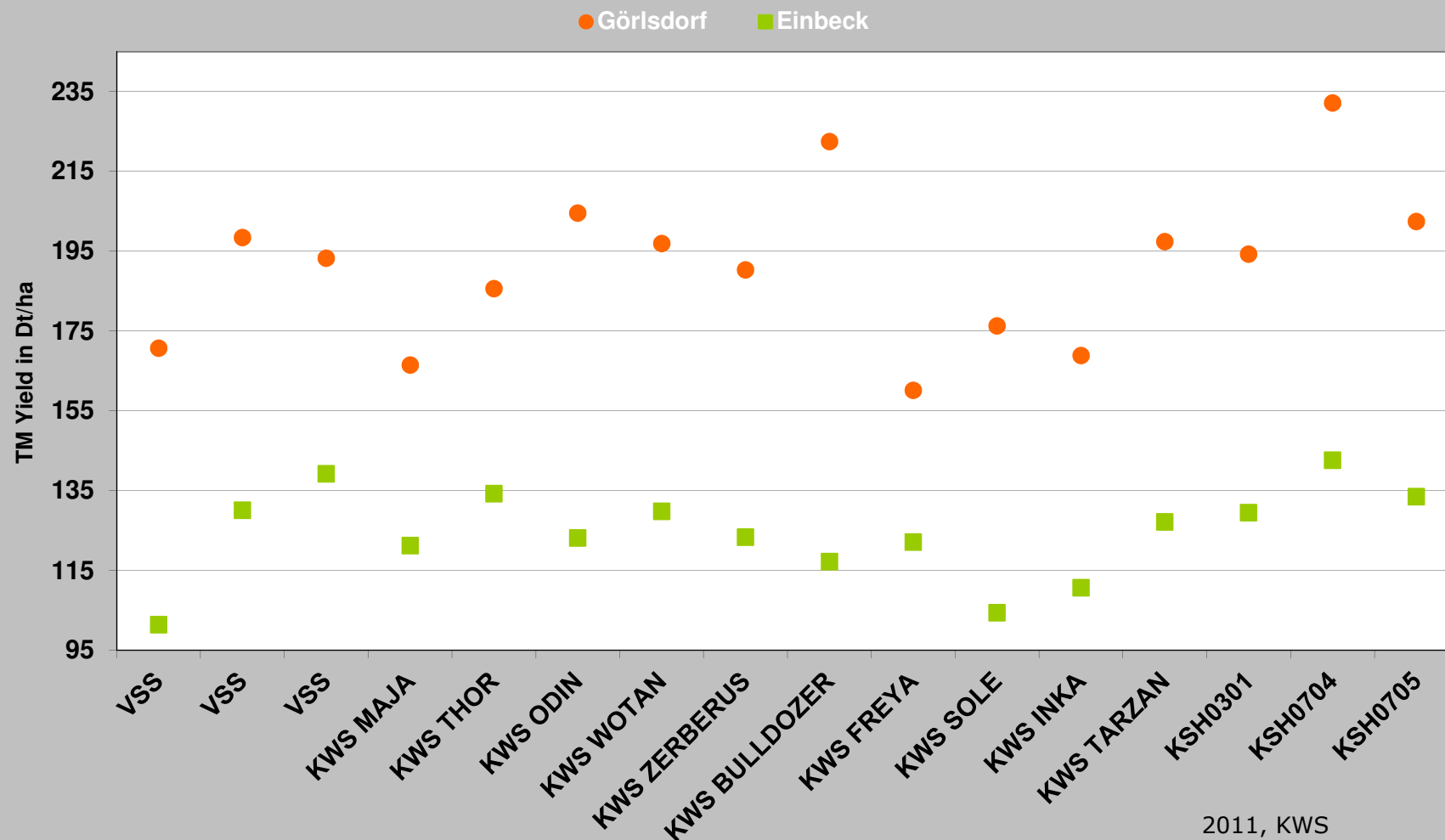
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1. Location choice

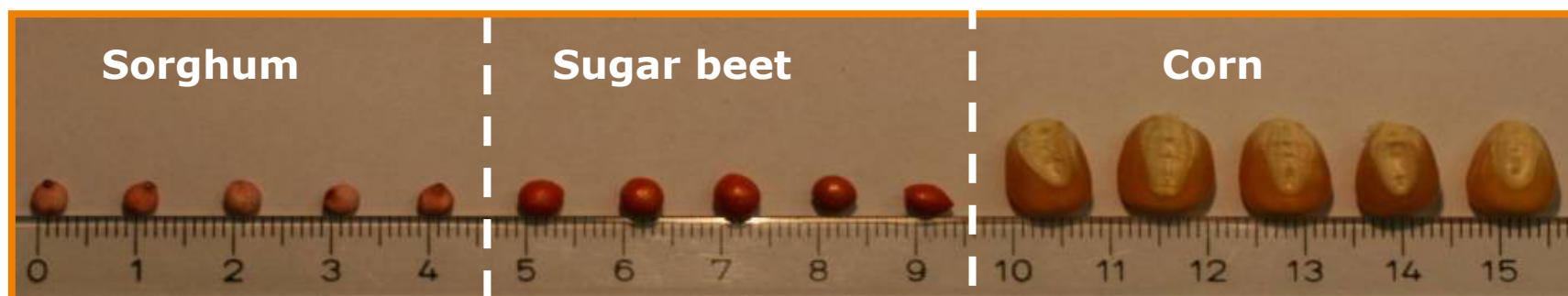
- Warm soils
- Light soils
 - Sandy soils are better than clay and heavy soils– they are easier to heat
- No areas with high grass pressure – poaceae
 - Uneasy to fight with – also Sorghum is from family poaceae
- General knowledge about soil analyze is necessary
 - => pH value
 - => Nutrition in soil

Comparison of two locations (sandy, warm soil vs. clay, cold soil)



2. Seed „bed“ preparation

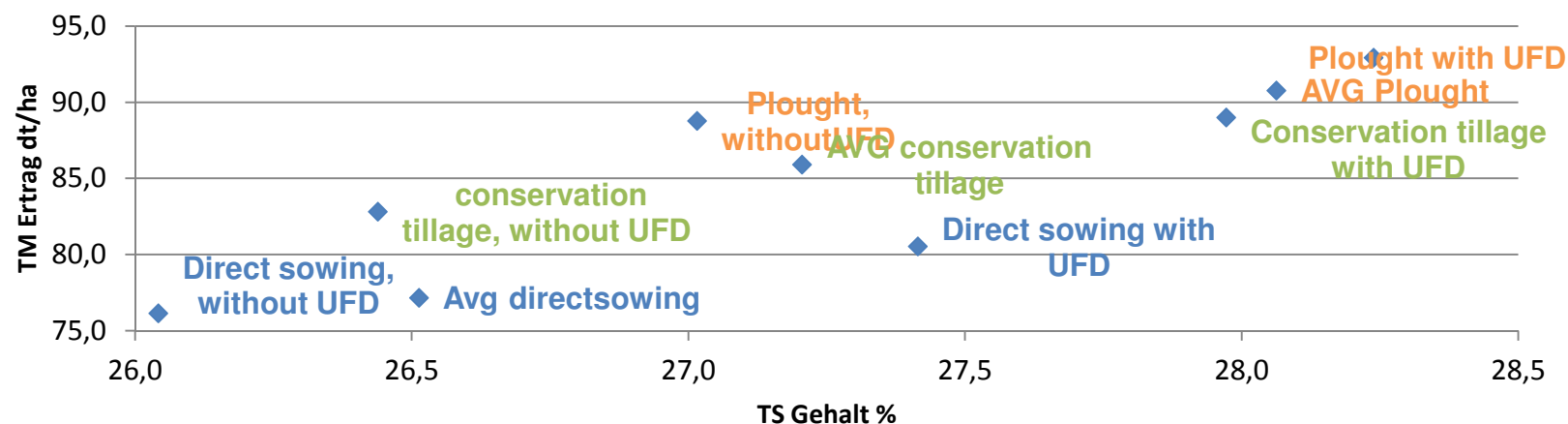
- Very precise seed bed preparation
 - Similar to oil seed rape or sugar beet
 - Good structure of seed bet
- Soil preparation after rye
 - Grubber
 - Plough
 - Disc harrow
 - Rotator
- Direct sowing after rye is not recommended !
- Soil pressure after sowing is necessary



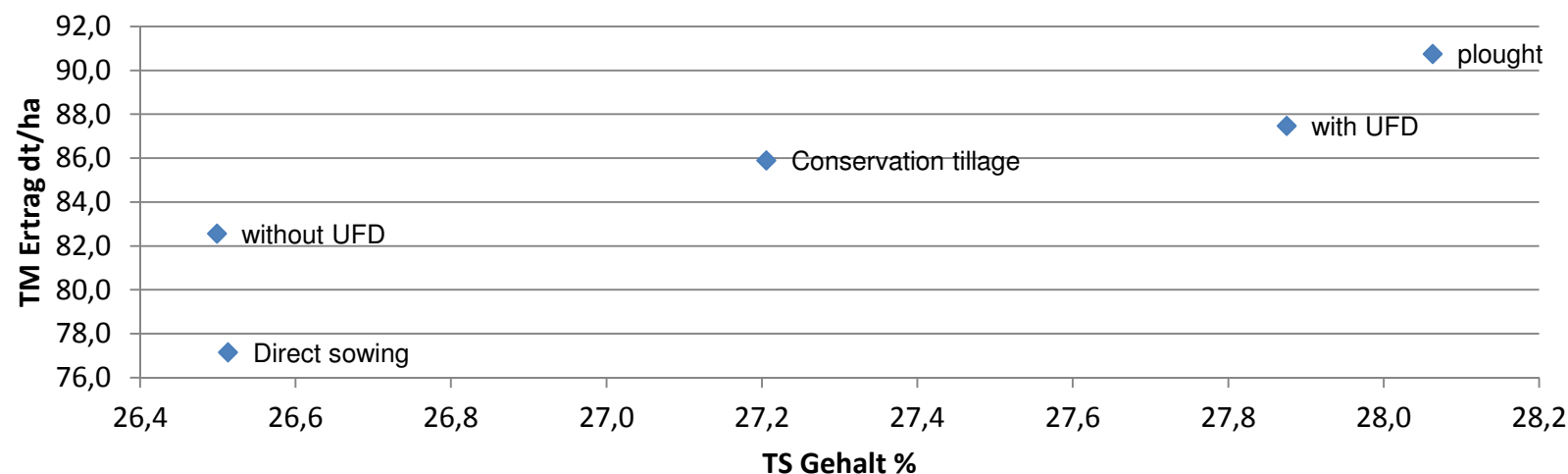
Quelle: KWS

Soil preparation trial by second crop 2012; 2013

2012 & 2013



Two years results by second crop



3. Sowing

- Right choice of the machinery
 - exact sowing of corn
 - exact sowing of sugar beet
 - cereals sowing machinery
- Temperature of the soil
 - min. 12 °C in 10 cm deepness
- Deepness of sowing between 3-5 cm
- P-under feet fertilization is recommended mainly for heavy soils
- Max 150 kg of nitrogen pro Hectare
=> in the case of higher fertilization is lodging risk
- Density of sowing vs. Row distance
 - By 22-45 cm
 - The is closed faster – advantage against weed

Soil Temp.	Effect on germination	Days till germination
12° C	Slow germination, more risky in case of diseases on the kernels in soil	> 14 Tage
15° C	Good germination	7-12 Tage
16° C	Relativ fast germination	
18° C	Relativ fast germination	5 – 7 Tage
20° C	Ideal germination	< 5 Tage



Quelle: KWS

4. Weed control

Combination proved by praxis

1. Gardo Gold with Certrol B
 1. Spraying Certrol B (bis 1,5 l)
 2. Spraying 10 days – 2 weeks later with Gardo Gold (2-4l) + Certrol B (0,5 l)
2. Gardo Gold (4 l) with Certrol B (0,3 l)
3. Gardo Gold (4l) with Spectrum (0,7 l)
4. Spektrum (max 1,4l) with Stomp aqua (0,5 l)

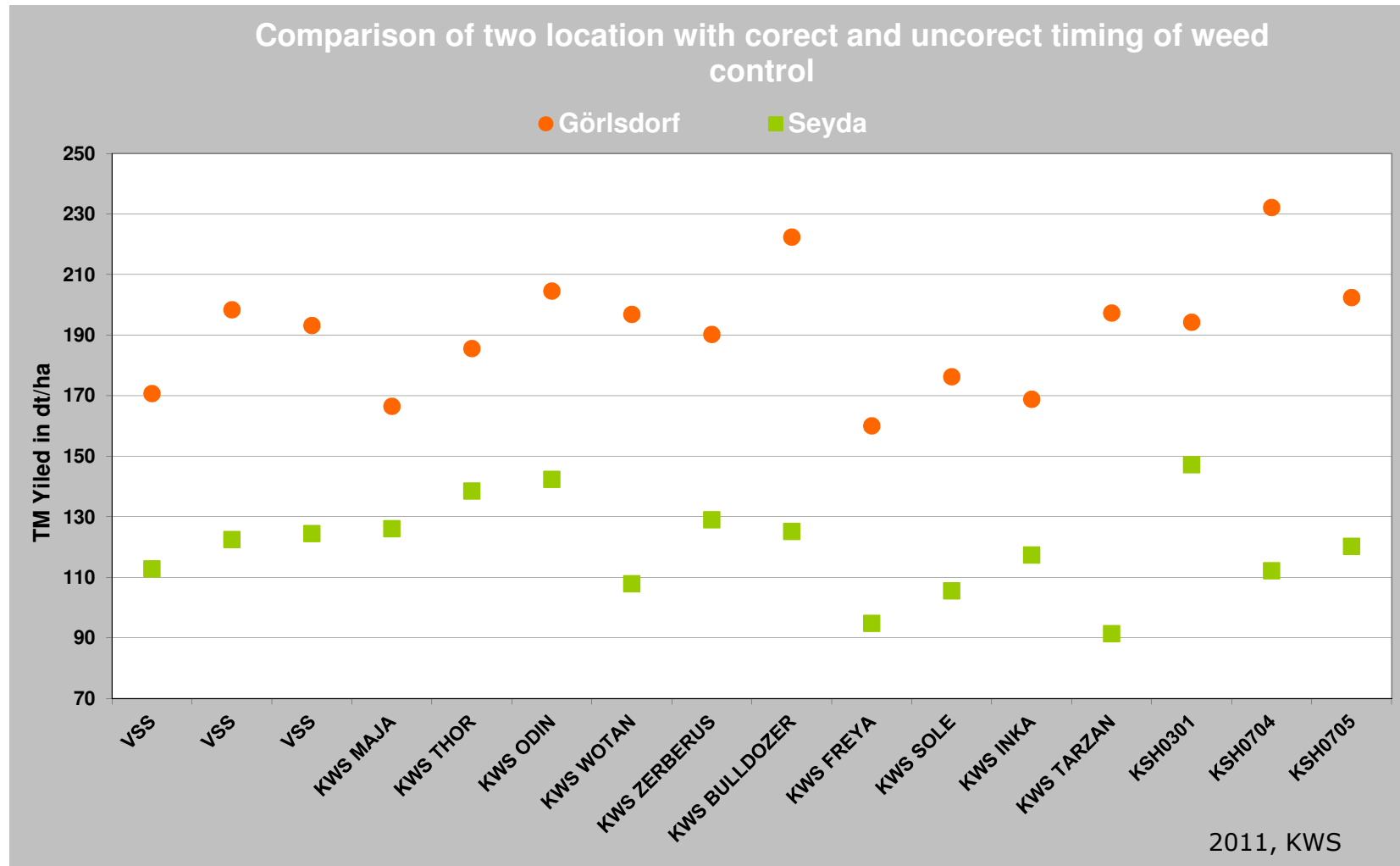


Weed control
Uncorect timing

Weed control
corect timing

Quelle: KWS

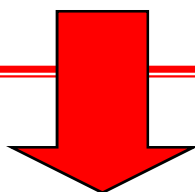
Comparison of 2 locations



Not possible to use in Sorghum management!!!!

attention!!!! Proof registration

- **Motivell** – Nicosulfuron 40g
- **Clio** – Topramezone 336 g
- **Callisto** – Mesotrione 100g
- **Calaris** – Terbutylazin 330 g, Mezotrione 70 g
- **Cato** – 25 % Rimsulfuron
- **MaisTer** - Foramsulfuron 300 g, Iodosulfuron-methylnatrium 10 g, Isoxadifen-ethyl (Safener) 300 g
- **Simplex** - Aminopyralid 30 g, Fluroxypyr 100 g
- **Mikado** – Sulcotrione 300 g
- **Laudis** – Tembotrione 44 g, Isoxadifen-ethyl (Safener) 22g
- Etc....

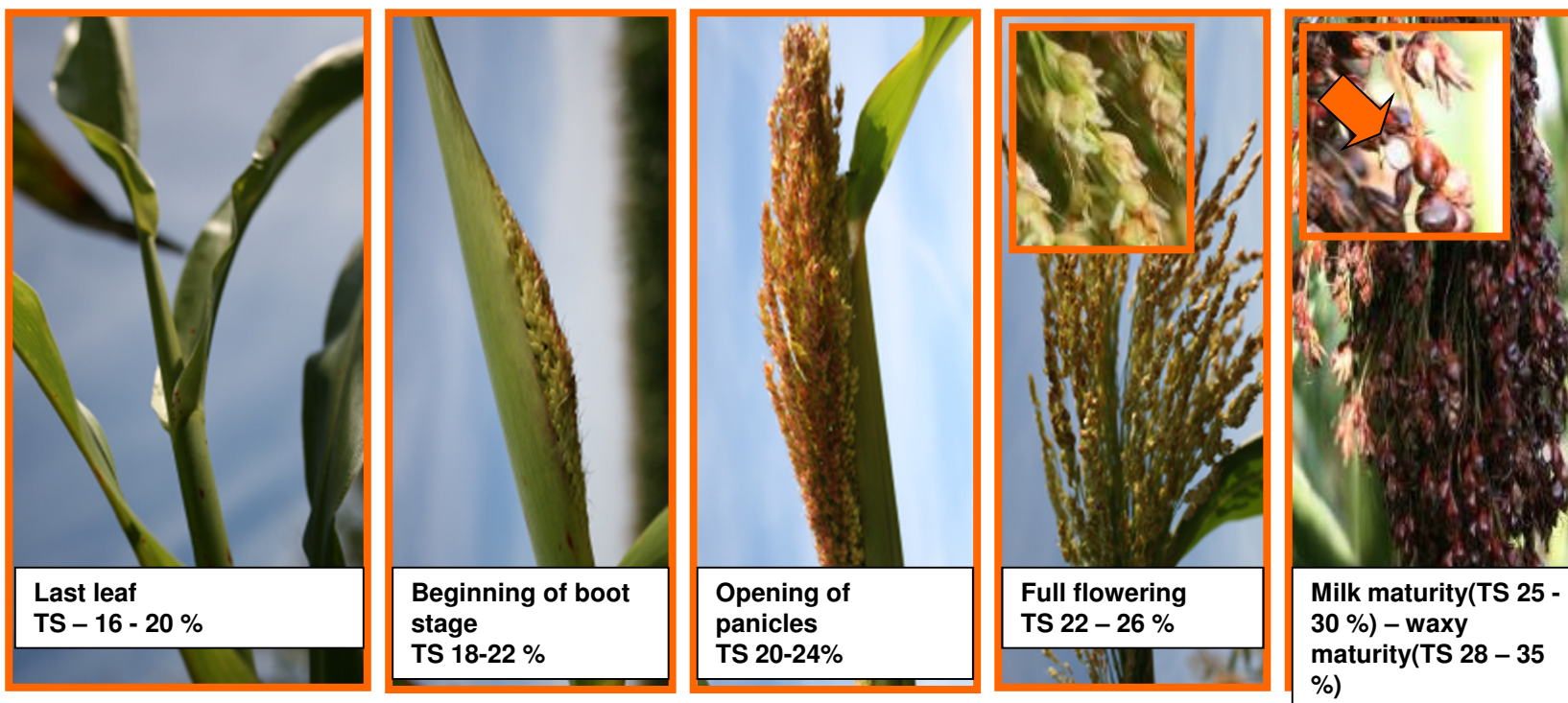


Usage of these herbicide lead to total death of Sorghum

5. Optimal harvest time

- Panicles are opened
- Kernels on the panicle are in developing
- Maturity of kernels between milk and waxy stadium

=> By early hybrids is necessary to take care, that the hybrids are not too mature – could be problematic with lodging.



Optimal time of harvest

