



# JOANNEUM RESEARCH Forschungsgesellschaft mbH

*Partner of*

*Economy*



johann.fank@joanneum.at  
www.joanneum.at  
Elisabethstraße 16/II, A-8010 Graz, Austria  
**INNOVATION plus TRADITION**

ISO 9001 zertifiziert

© JOANNEUM RESEARCH Forschungsgesellschaft mbH



# RESEARCH STATION „WAGNA“

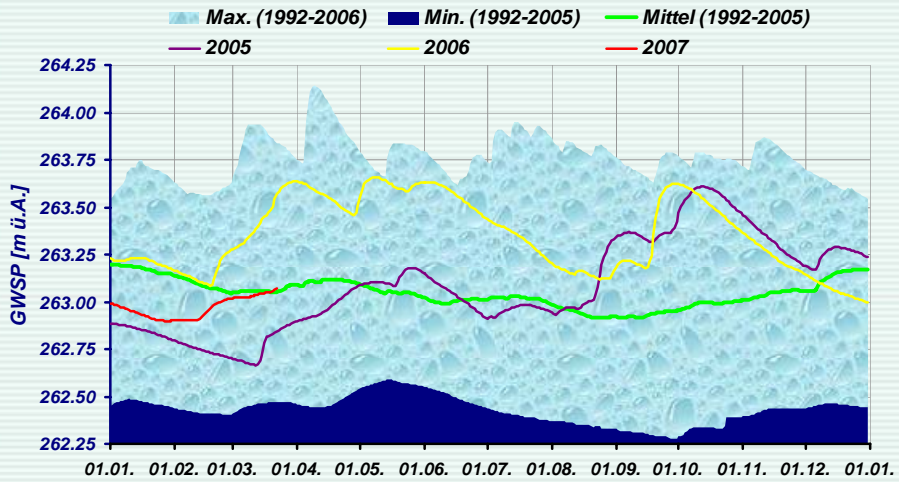
2006: Results of Lysimeter Measurements

johann.fank@joanneum.at  
www.joanneum.at  
Elisabethstraße 16/II, A-8010 Graz, Austria  
**INNOVATION plus TRADITION**

ISO 9001 zertifiziert

© JOANNEUM RESEARCH Forschungsgesellschaft mbH

## Groundwater Table Elevation

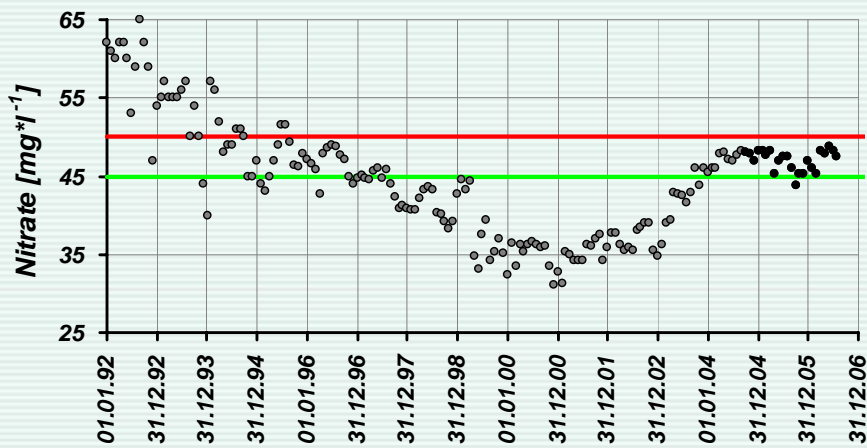


© JOANNEUM RESEARCH Forschungsgesellschaft mbH

INNOVATION aus TRADITION

ISO 9001 zertifiziert

## Groundwater – Nitrate Concentration

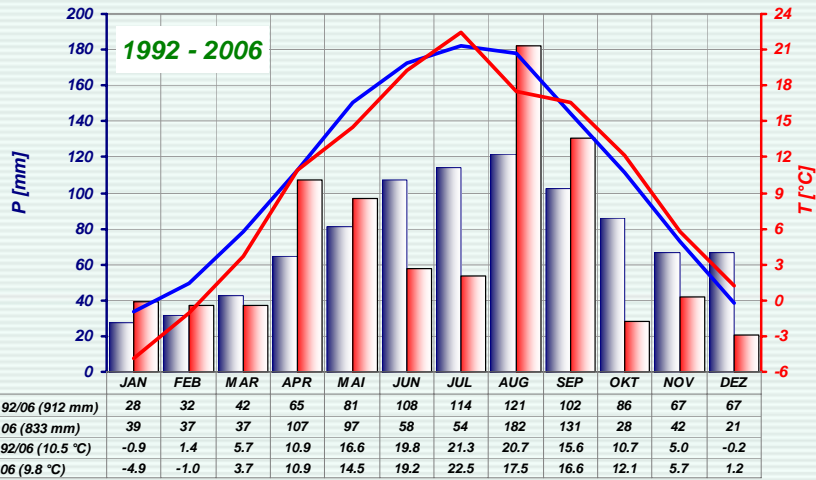


© JOANNEUM RESEARCH Forschungsgesellschaft mbH

INNOVATION aus TRADITION

ISO 9001 zertifiziert

# Weather



© JOANNEUM RESEARCH Forschungsgesellschaft mbH

INNOVATION aus TRADITION

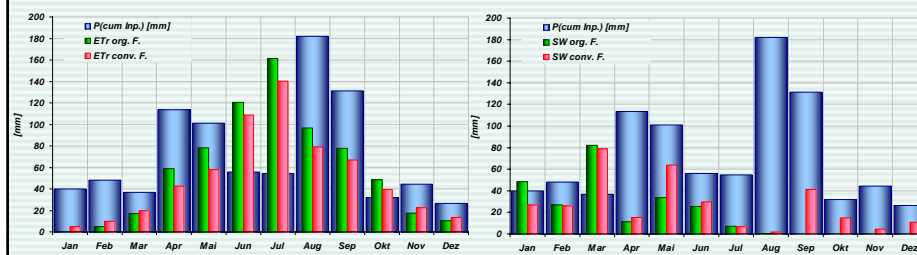
ISO 9001 zertifiziert

# Water Balance

Org. Farm.	Jan	Feb	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez	Jahr
P <sub>(cum. Inp.)</sub> [mm]	40.1	48.1	36.9	113.6	101.1	55.9	54.6	181.9	131.3	31.8	44.6	26.4	866.3
ET <sub>r</sub> (Balance) [mm]	-4.4	4.8	16.9	58.8	78.3	120.4	161.2	96.6	77.6	48.6	17.3	10.2	686.3
SW [mm]	48.3	26.8	81.9	11.4	33.7	25.4	7.3	0.3	0.0	0.0	0.0	0.0	235.1
Weight Balance [kg]	-3.8	16.6	-62.0	43.4	-10.9	-89.9	-113.9	85.0	53.7	-16.8	27.3	16.2	-55.1

Conv. Farm.	Jan	Feb	Mar	Apr	Mai	Jun	Jul	Aug	Sep	Okt	Nov	Dez	Jahr
P <sub>(cum. Inp.)</sub> [mm]	40.6	48.5	35.9	114.2	98.8	60.1	60.1	194.2	137.8	36.6	50.3	29.8	907.0
ET <sub>r</sub> (Balance) [mm]	5.1	10.0	19.8	42.8	57.9	108.7	140.0	79.2	67.0	39.4	22.6	13.3	606.1
SW [mm]	26.8	25.9	78.7	15.1	63.6	29.6	6.9	1.8	41.1	14.9	4.6	10.7	319.7
Weight Balance [kg]	8.7	12.5	-62.7	56.3	-22.7	-78.2	-86.9	113.2	29.7	-17.6	23.1	5.7	-18.8



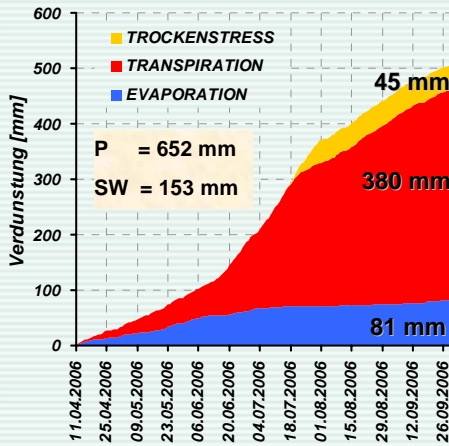
© JOANNEUM RESEARCH Forschungsgesellschaft mbH

INNOVATION aus TRADITION

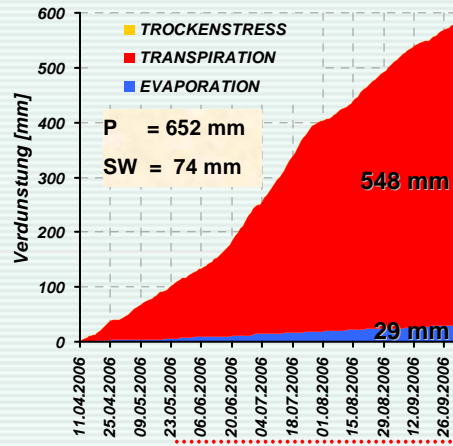
ISO 9001 zertifiziert

# Evapotranspiration

KON – Mais



BIO – Klee/Grasmischung



© JOANNEUM RESEARCH Forschungsgesellschaft mbH

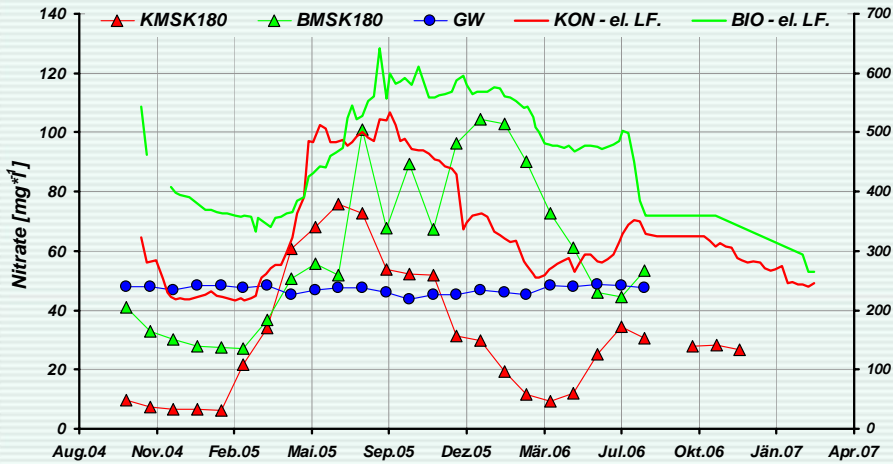
INNOVATION aus TRADITION

ISO 9001 zertifiziert





# Seepage Water – Nitrate Concentration; el. Conductivity



© JOANNEUM RESEARCH Forschungsgesellschaft mbH

INNOVATION aus TRADITION

ISO 9001 zertifiziert

# Nutrients in the Vegetation 2006

Sample	organic farming				cum. Sum Grass	conventional farming		cum. Sum Maize
	Grass 20060510	Grass 20060613	Grass 20060809	Grass 20060926		Maize leaves	Maize seeds	
Dry weight [kg/m <sup>2</sup> ]	0.219	0.183	0.364	0.270	1.035	1.338	0.815	2.153
Harvesting weight [kg/m <sup>2</sup> ]	1.750	1.541	1.715	2.387	7.393	3.577	1.245	4.822
Water content [kg/m <sup>2</sup> ]	1.531	1.358	1.351	2.117	6.357	2.239	0.429	2.669
Nitrogen (Kjeldahl) [g/100g]	2.100	2.410	2.820	2.940	10.270	1.080	1.690	2.780
[kg/ha]	45.938	44.194	102.514	79.298	271.944	145.832	137.782	283.614
Phosphorus [g/100g]	0.322	0.340	0.290	0.360	1.312	0.170	0.330	0.500
[kg/ha]	7.044	6.235	10.542	9.710	33.531	22.744	26.904	49.649
Potassium [g/100g]	3.040	3.430	2.780	3.370	12.620	1.110	0.360	1.470
[kg/ha]	66.500	62.899	101.060	90.896	321.355	148.508	29.350	177.858
Calcium [g/100g]	0.814	0.950	1.450	1.470	4.684	0.450	0.010	0.460
[kg/ha]	17.806	17.421	52.711	39.649	127.587	60.206	0.815	61.021
Carbon [g/100g]	90.100	89.300	87.600	88.100	355.100	94.400	98.500	192.900
[kg/ha]	1970.938	1637.574	3184.478	2376.241	9169.230	12629.872	8030.493	20660.365
Magnesium [g/100g]	0.149	0.190	0.270	0.240	0.849	0.120	0.130	0.250
[kg/ha]	3.259	3.484	9.815	6.473	23.032	16.055	10.599	26.654
Boron [mg/1000g]	31.300	20.700	17.100	21.100	90.200	5.200	1.800	7.000
[kg/ha]	0.068	0.038	0.062	0.057	0.226	0.070	0.015	0.084
Manganese [mg/1000g]	46.200	47.300	70.300	50.400	214.200	37.600	6.500	44.100
[kg/ha]	0.101	0.087	0.256	0.136	0.579	0.503	0.053	0.556
Sodium [mg/1000g]	200.000	346.200	473.200	469.000	1488.400	55.000	35.000	90.000
[kg/ha]	4.38	0.635	1.720	1.265	4.058	0.736	0.285	1.021
Copper [mg/1000g]	5.380	8.570	8.740	8.740	31.430	8.120	2.120	10.240
[kg/ha]	0.012	0.016	0.032	0.024	0.083	0.109	0.017	0.126
Zinc [mg/1000g]	24.900	26.500	22.300	22.300	96.000	25.900	21.700	47.600
[kg/ha]	0.054	0.049	0.081	0.060	0.244	0.347	0.177	0.523
Iron [mg/1000g]	317.000	198.800	882.500	346.500	1742.800	267.100	30.200	297.300
[kg/ha]	0.693	0.361	3.208	0.935	5.197	3.574	0.246	3.820

© JOANNEUM RESEARCH Forschungsgesellschaft mbH

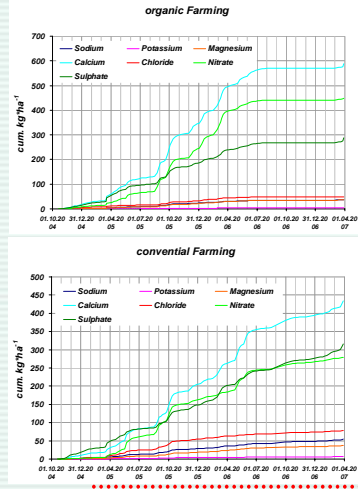
INNOVATION aus TRADITION

ISO 9001 zertifiziert

# Nutrients Leaching to Groundwater (since 01.10.2004)

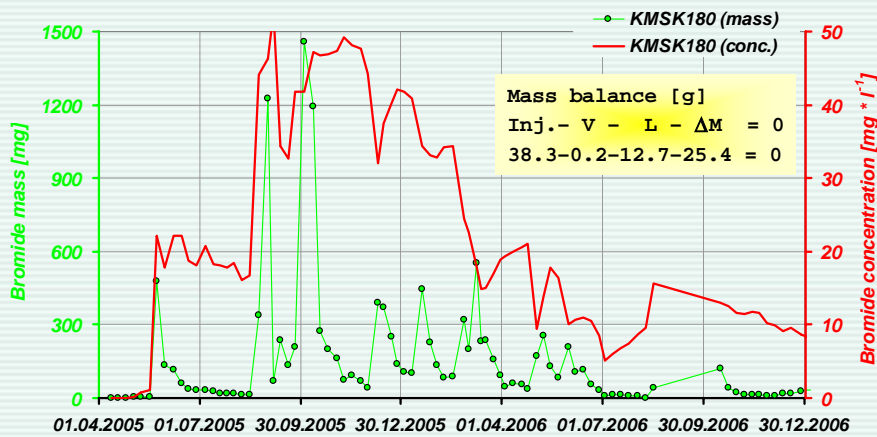
Solute leaching since 01.10.2004

Parameter	Unit	Conventional Farming	Organic Farming
cum. Sum of SW	mm	777	680
mean value of el. cond.	$\mu\text{S}\cdot\text{cm}^{-1}$	330	473
mean value of pH	-	7.17	7.35
<b>Leaching</b>			
Sodium	$\text{kg}\cdot\text{ha}^{-1}$	55.20	37.08
Potassium	$\text{kg}\cdot\text{ha}^{-1}$	6.58	3.90
Magnesium	$\text{kg}\cdot\text{ha}^{-1}$	37.74	36.36
Calcium	$\text{kg}\cdot\text{ha}^{-1}$	434.51	587.43
Chloride	$\text{kg}\cdot\text{ha}^{-1}$	78.53	48.83
Nitrate	$\text{kg}\cdot\text{ha}^{-1}$	278.92	447.51
Sulphate	$\text{kg}\cdot\text{ha}^{-1}$	315.63	287.29
<b>Mean Concentration measured</b>			
Sodium	$\text{mg}\cdot\text{l}^{-1}$	7.28	5.48
Potassium	$\text{mg}\cdot\text{l}^{-1}$	0.88	0.57
Magnesium	$\text{mg}\cdot\text{l}^{-1}$	4.77	5.25
Calcium	$\text{mg}\cdot\text{l}^{-1}$	53.54	83.54
Chloride	$\text{mg}\cdot\text{l}^{-1}$	10.57	7.37
Nitrate	$\text{mg}\cdot\text{l}^{-1}$	35.78	58.74
Sulphate	$\text{mg}\cdot\text{l}^{-1}$	42.30	43.95



INNOVATION aus TRADITION

# KON Tracer – Balance



INNOVATION aus TRADITION

# BIO Tracer – Balance

