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# Comparison of soil test methods for phosphorus and potassium in Southern Russia

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# Routinely used extractants for soil P and K in Russia

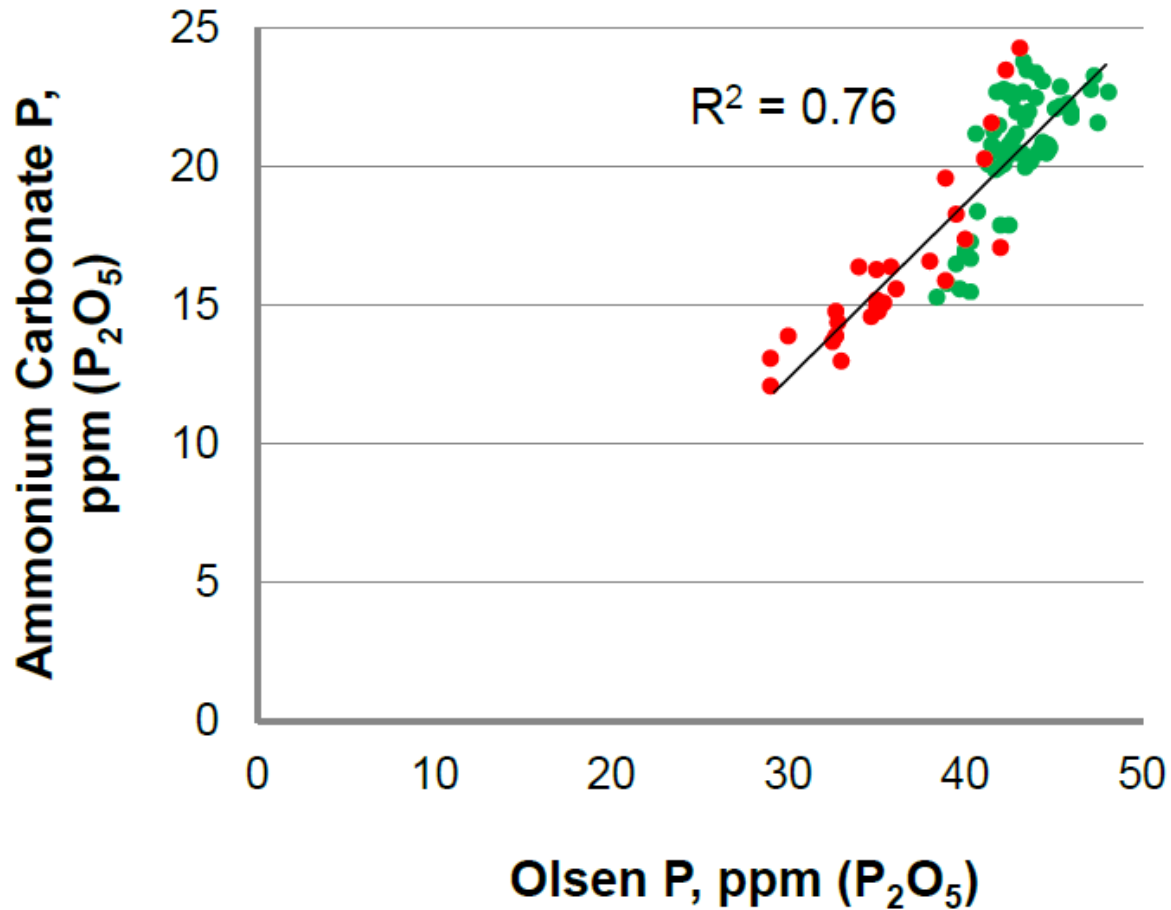
Soils types/subtypes	WRB, 2006	Extractant
Soddy podzolic soils	Umbric Albeluvisols	0.2 M HCl 1:5
Gray forest soils Podzolised chernozems Leached chernozems Typical chernozems	Greyic Phaeozems Luvic Phaeozems Voronic Chernozems »	0.5 M CH <sub>3</sub> COOH 1:25
Ordinary chernozems Southern chernozems Chestnut soils	Voronic Chernozems Haplic Chernozems Haplic Kastanozems	1% (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> pH 9 1:20

# Some initial physical and chemical properties of ordinary chernozems in Rostov Region (IPNI Global Maize Project)

Location	Texture	pH	OM, %	Ammonium Carbonate P	Olsen P	Ammonium Carbonate K	Ammonium Acetate K
				ppm			
Tselina Distr.	Clay loam	7.7-7.9	2.9-3.2	10-11	16-18	254-276	354-384

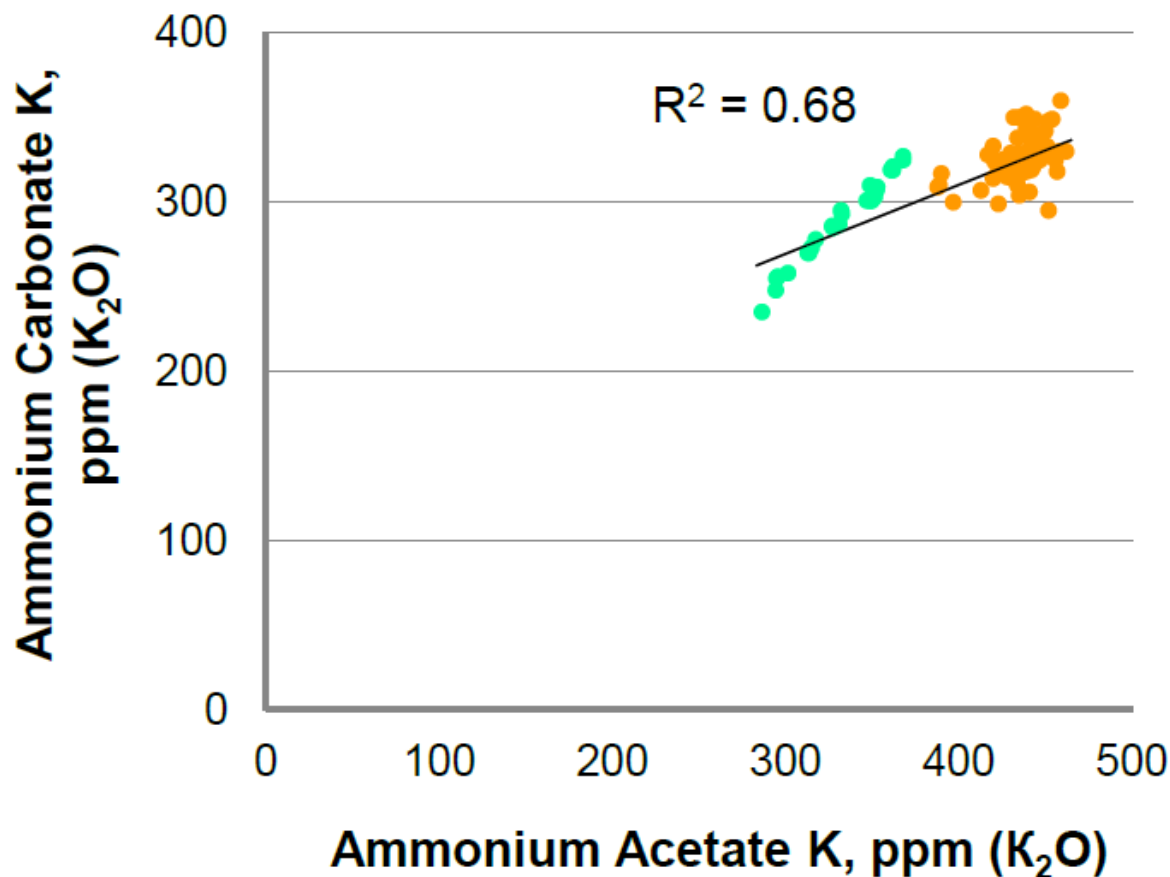
Soil test classes	Very low	<5	<83
	Low	5-6	83-166
	<b>Medium</b>	<b>7-13</b>	167-249
	<b>Increased</b>	14-19	<b>250-332</b>
	High	20-26	333-498
	Very high	>26	>498

# Relationship between Ammonium Carbonate P and Olsen P in ordinary chernozems



- 64 samples from experimental plots with various P fertilization taken in 2012-2013 (Tselina Distr.)
- 27 samples from farmer field (39 ha area) taken in 2012 r. (Egorlyk Distr.)

# Relationship between Ammonium Carbonate K and Ammonium Acetate K in ordinary chernozems



- 64 samples from experimental plots with various K fertilization taken in 2012-2013 (Tselina Distr.)
- 27 samples from farmer field (39 ha area) taken in 2012 r. (Egorlyk Distr.)

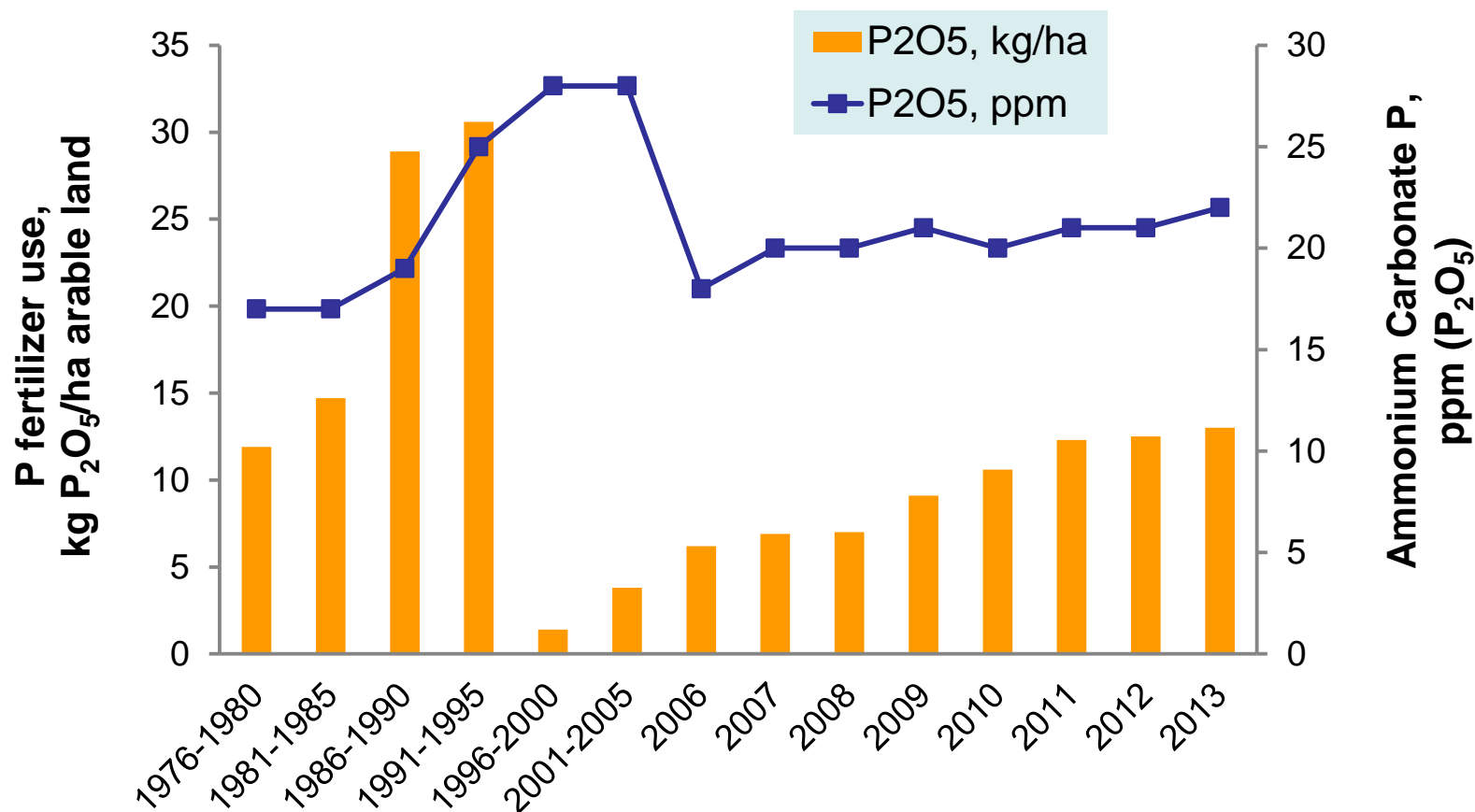
# Maize response to P and K fertilization (IPNI Global Maize Project)

Treatment	Grain yield, t/ha			
	2011	2012	2013	Average
N <sub>100</sub> K <sub>60</sub>	7.93	7.17	5.82	6.97
N <sub>100</sub> P <sub>80</sub>	8.43	7.38	5.94	7.25
N <sub>100</sub> P <sub>80</sub> K <sub>60</sub>	8.99	7.50	6.10	7.53
LSD <sub>0.05</sub>	0.27	0.09	0.21	

Average yield increase (and range), %	
due to P use	due to K use
8 (5-13)	4 (2-7)

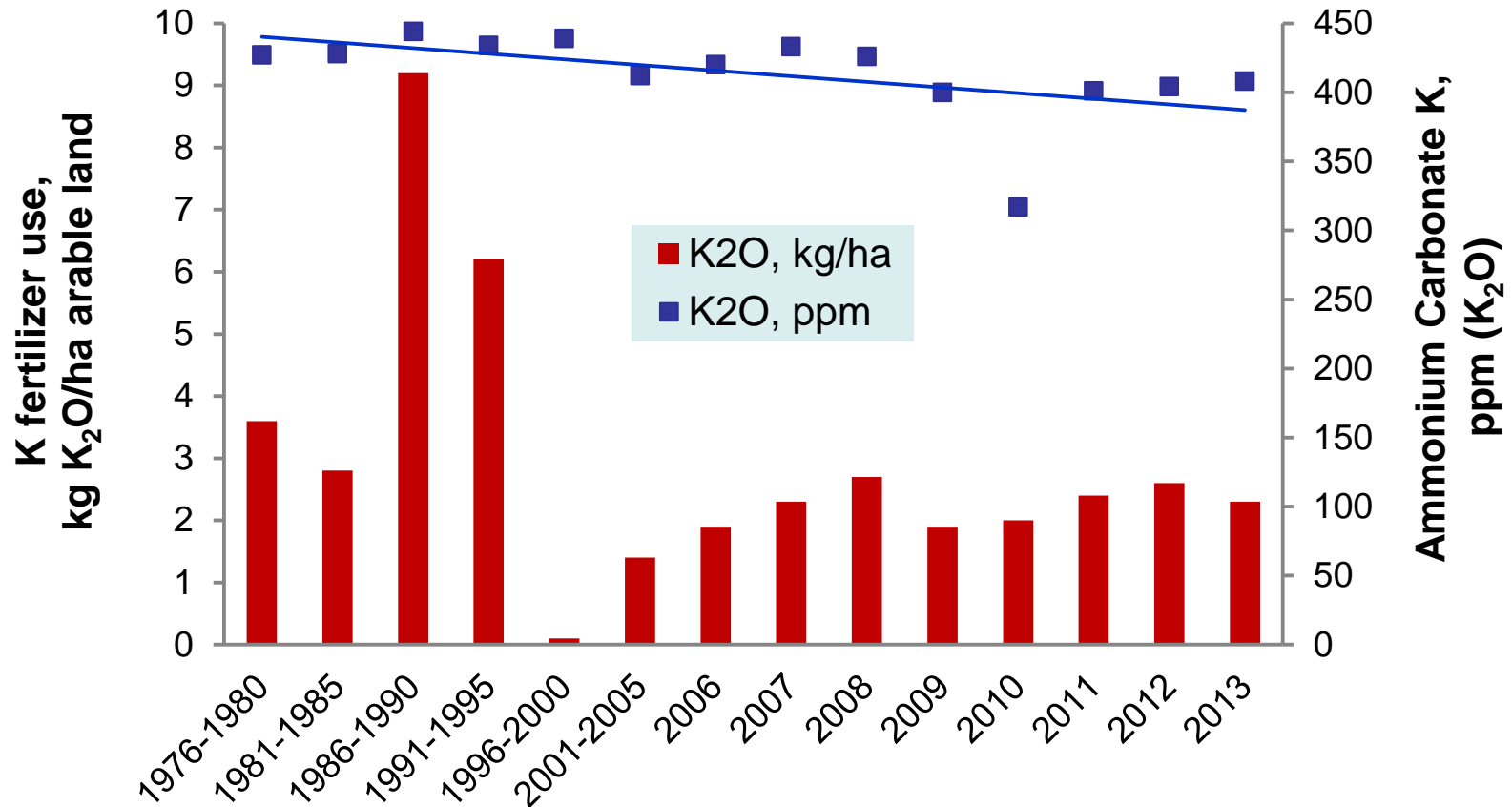
Note: Seeds were treated with Zn.

# P fertilizer use and Ammonium Carbonate P level in soils of Rostov region



Source: Centre for Agrochemical Service "Rostovskiy", 2014

# K fertilizer use and Ammonium Carbonate K level in soils of Rostov region



Source: Centre for Agrochemical Service "Rostovskiy", 2014



# Conclusions:

- ✓ **A very strong correlation was observed between Ammonium Carbonate P and Olsen P and also between Ammonium Carbonate K and Ammonium Acetate K in ordinary chernozems.**
- ✓ **Maize yield response to P and K fertilizer application on ordinary chernozem corresponds well with soil test interpretation classes for available P and K using a routine extraction procedure (Ammonium Carbonate solution).**
- ✓ **Dynamics of available P and K in soils measured using a routine extraction procedure (Ammonium Carbonate solution) reflects P and K balance in the region.**



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Thank you!

