

**CULTIVAR DIFFERENCES  
IN CD, ZN AND PB ACCUMULATION  
AND PRODUCTIVITY OF DURUM WHEAT PLANTS  
GROWN IN METAL CONTAMINATED SOILS**

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**ABSTRACT**

A pot experiment has been conducted in “Poushkarov” Institute of Soil Science during 2007 to study the effects of metal contaminated soil on Cd, Zn and Pb plant accumulation, plant performance and grain productivity of three durum wheat cultivars. The contaminated soil was taken from the vicinity of the non-ferrous metal producing smelter near Plovdiv, while the control, noncontaminated soil having similar physical-chemical properties - from the experimental field of the Agricultural University of Plovdiv. Plant samples were taken and measured for heavy metal content in root, leaf, stem and grain during the vegetation period. Both chlorophyll content and leaf gas exchange parameters were determined in the flag leaf at the stage of grain filling. The grain productivity was established at harvest. The results showed that the wheat plants from all cultivars grew weaker in metal contaminated soil than the respective controls during the whole vegetation period. This corresponded to their decreased net photosynthetic rate, final shoot dry biomass accumulation as well as lower grain productivity. Grain Cd content was over the permissible limits in all durum wheat cultivars.

Table 1  
Heavy metal content in plant organs of durum wheat cultivars grown in metal contaminated soil

Treatments		Heavy metal content in plant organs (mg kg <sup>-1</sup> dry mass)		
Cultivars	Soil status	Heavy metal	Roots	Leaf
Vazhod	noncontaminated (control)	Cd	0.37	0.23
		Zn	46.0	19.6
		Pb	3.7	6.0
	contaminated	Cd	15.3	4.5
		Zn	305.0	171.5
		Pb	26.7	9.9
Yavor	noncontaminated (control)	Cd	0.36	0.20
		Zn	83.2	18.2
		Pb	3.9	5.8
	contaminated	Cd	12.4	5.3
		Zn	326.1	229.2
		Pb	22.4	9.27
Saturn 1	noncontaminated (control)	Cd	0.40	0.27
		Zn	73.3	27.3
		Pb	3.7	6.6
	contaminated	Cd	15.5	5.05
		Zn	338.0	242.1
		Pb	23.8	11.6
Cultivars	Soil status	Heavy metal	Stem	Grain
Vazhod	noncontaminated (control)	Cd	0.22	0.09
		Zn	7.7	21.9
		Pb	3.3	1.9
	contaminated	Cd	3.8	1.39
		Zn	308.2	64.5
		Pb	6.6	3.4
Yavor	noncontaminated (control)	Cd	0.18	0.07
		Zn	7.3	40.8
		Pb	3.3	0.9
	contaminated	Cd	3.5	2.21
		Zn	396.1	76.5
		Pb	5.9	1.5
Saturn 1	noncontaminated (control)	Cd	0.26	0.11
		Zn	4.0	38.7
		Pb	9.7	1.3
	contaminated	Cd	5.6	1.72
		Zn	308.3	61.5
		Pb	7.2	1.5