In general, K levels in soils of the Eastern Croatia are estimated as satisfied. However, K deficiency is found on some gleysols situating in valley of Sava River. By performed soil test, K deficiency is widespread in areas of former Zupanja, Beli Manastir and Slav. Brod communes. Also, it is widespread in area of Nova Gradiska commune, but probably because of inadequate soil test (AL-method) for this problem soil, K status in soils found as satisfied. Alkaline soil reaction and high Mg concentrations, as well as high clay contents, are additional problems of some soils characterizing K deficiency.

During the last two decades period (from 1970 to 1989), routine soil test (AL-method: Egner, Riehm and Domingo, 1960) on the arable lands which are in property of former state farms was made (total 126318 ha). Low plant available K status (less than 10 mg K$_2$O/100 g of soil) was found on 21073 ha or 17% of analyzed area. Remaining part is moderate (from 10 to 15 mg K$_2$O/100 g: 29384 ha or 29%), satisfied (from 15 to 20 mg K$_2$O/100 g: 37095 ha or 29%), good (from 20 to 25 mg K$_2$O/100 g: 23856 mg K$_2$O/100 g: 23856 ha or 19%) and very good (above 25 mg K$_2$O/100 g: 14909 ha) supplied by K. In general, arable lands in property of small private farms (peasant holdings) are unknown of K status, because only 4% of this land are affected by routine soil testing.

Four field trials (a, b, c and d) with increased K fertilization (in KCl form) to rates either 920 (a), 825 (b), 2220 (c) or 2125 (d) kg K/ha were conducted on soils which are known to produce K deficiency. In the first year of testing, maize grain yields of the control treatment (standard fertilization) were as follows: 4.98 (a), 2.48 (b), 1.75 (c) and 3.81 (d) t/ha, but they were considerably increased by application of the highest K rate (8.96, 7.62, 8.88 and 7.13 t/ha, for the trial a, b, c and d, respectively). The ear-leaf K and Mg status (% in dry matter at beginning of the silking stage: averages of the four trials) were as follows: 0.64% K and 1.82% Mg (standard fertilization), 1.60% K and 1.11% Mg (the highest rate of K application). K-fixation capacities of these soils (wet-fixation procedure; addition 100 mg K to 100 mg soil) were as follows: 71% (a), 76% (b), 81% (c) and 88% (d).

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