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Dry matter and nutrients accumulation by soybean cultivars

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Our objective was to organize and compare the results of plant nutrient accumulation, in soybean experiments carried out at Embrapa Soybean, at Londrina, Paraná State, Brazil. We evaluate the uptake of nutrients and their amounts removed with grains since the 2010/2011 cropping season, using indeterminate growth type cultivars, which currently predominates in Brazilian soybean producing areas. In each season, plant samples collected in vegetative and reproductive growth stages had their leaves, stems, pods and grains analyzed for dry matter (DM) and nutrient contents. We adjusted the nutrient accumulation curves using regression models. Yields varied from 3184 to 3802 kg $ha^{-1}$, with an average of 3437 kg $ha^{-1}$. Total DM yield ranged from 7158 to 12000 kg $ha^{-1}$, therefore, the mean apparent harvest index was approximately 0.4. Total nutrient uptake increased in proportion to the increase in DM yield; however, the higher DM yield did not result necessarily in higher grain yield and nutrient export. The total uptake of macronutrients by soybean cultivars, on average, was 269 kg $ha^{-1}$ of N; 23 kg $ha^{-1}$ of P; 165 kg $ha^{-1}$ of K; 76 kg $ha^{-1}$ of Ca; 37 kg $ha^{-1}$ of Mg; and 15 kg $ha^{-1}$ of S. The nutrient removal with grains, on average, was 204 kg $ha^{-1}$ of N; 18 kg $ha^{-1}$ of P; 67 kg $ha^{-1}$ of K; 11 kg $ha^{-1}$ of Ca; and 10 kg $ha^{-1}$ of Mg and S. For micronutrients, total uptake and removal with grains were, respectively, 258 and 156 g $ha^{-1}$ of Zn; 680 and 148 g $ha^{-1}$ of Mn; 1285 and 245 g $ha^{-1}$ of Fe; 68 and 43 g $ha^{-1}$ Cu; 283 and 115 g $ha^{-1}$ of B. These results reinforce the necessity of soil fertility monitoring for the correct replacement of nutrients removed with grain harvests.