DIAGNOSIS OF NUTRITIONAL DISORDERS IN BEANS USING SEED ANALYSIS

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The use of seed analysis as a means of identifying nutrient deficiencies is less commonly used than foliar analysis, but its usefulness in diagnosis of nutritional problems in beans has been demonstrated (Brodrick *et al.*, 1995). When sampling extensively, relying on collaborators for sample collection, seed analysis has the advantage that timing of sample collection is less critical, and sample preparation is easier, than with foliar analysis.

Seed samples were collected from farmers in major bean growing areas in Ethiopia, Uganda, Rwanda and Zaire and analyzed for nutrient concentrations to diagnose nutrient deficiencies.

The results indicate calcium to be severely deficient in the Mulungu area of Zaire, deficient in Butare area of Rwanda and occasionally deficient in Uganda (Table 1). Copper was low at the Rwanda locations relative to other locations, but still above the critical level used by Brodrick *et al.* (1995) and supporting evidence for Cu deficiency in these areas is lacking. Phosphorus is frequently low in the Hararghe Highlands of Ethiopia and in Uganda. Zinc was relatively low in the Hararghe Highlands, but still in the sufficiency range (> 10 ppm) used by Brodrick *et al.* (1995). Magnesium deficiency does not appear to be a constraint in any of these locations.

Reference: Brodrick, S.J., F. Amijee, J.A. Kipe-Nolt, and K.E. Giller, 1995. Seed analysis as a means of identifying micronutrient deficiencies of *Phaseolus vulgaris* L. in the tropics. Trop. Agric. 72 (4):277-284.

TABLE 1: Minimum and mean nutrient levels in bean seed samples collected in Ethiopia, Rwanda, Zaire and Uganda.

	Hararghe, Ethiopia n=24		Butare/ Cyarura, Rwanda n = 17		Mulungu, Zaire n = 25		C. & W. Uganda n = 14	
	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean
P %	0.32	0.42	0.40	0.48	0.54	0.57	0.32	0.42
Ca %	0.13	0.18	0.12	0.12	0.09	0.13	0.09	0.14
Mg %	0.15	0.16	0.18	0.18	0.17	0.19	0.16	0.18
Cu ppm	7.80	10.5	5.48	7.66	7.30	10.3		
Zn ppm	16.3	23.3	22.9	25.4	20.5	27.3	24.2	27.8

Sufficiency levels: P 0.36%; Ca 0.15%; Mg 0.16%; Cu 15-25 ppm; and Zn 40-50 ppm.